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Russian ammunition

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Intermediate cartridges 5.45x39

The development of the new cartridge was carried out by a group of designers and technologists from TsNIItochmash under the leadership of V.M. Sabelnikov (L.I. Bulavskaya, B.V. Semin, M.E. Fyodorov, P.F. Sazonov, V.I. Volkov, V.A. Nikolaev, E.E. Zimin, P.S. Korolev and others).

The cartridge consists of a bottle-shaped steel cartridge case (7Ch9.000) with two priming holes, Berdan primer, a pointed bullet with a tapered bottom part and a "Sf033fl" powder charge (Spherical with a thickness of the burning arch - 0.33 mm, phlegmatized). Used until 1989, after which it was replaced by "SSNf30/3,69": the first letter stands for the function of the powder (C - for small arms), the second letter stands for the shape of the powder grain (C - spheroid), the third - for the presence of nitroglycerin (H), the fourth - for the presence of phlegmatizer (F), 30 - for the thickness of the burning crown (0,3 mm), 3,69 - calorific value MJ/kg. The bullet consists of a steel clad tompak shell and a steel core in a lead jacket with a cavity in the head part of the bullet. The shape of the bullet is designed so that it flies at the edge of stability and loses it easily when hitting a denser environment than air. Until 1987, steel cores were made of steel St.10, and since 1987, in order to improve penetration characteristics

PS bullets, the core of 7N6M ammunition was made of heat-hardened steel of the 65G, 70, and 75 grades with a hardness of 60
"HRC.

In 1974 the cartridge was adopted for service under the index *"GRAU 7H6"*. Production of "7H6" cartridges was mastered at plants #3 (Ulyanovsk Machine Building Plant), #7 (Amur Cartridge Plant), #17 (Barnaul Machine Tool Plant), #60 (Frunze Cartridge Plant), #270 (Lugansk Cartridge Plant) and
No. 539 (Tula cartridge factory). Cartridges are produced with lacquered steel cartridge cases. Attempts have been made to produce cartridges with bimetal and zinc-coated steel cartridge cases.

A fairly wide range of ammunition with standard and special bullets was developed. In addition to military versions of the cartridge, there are export versions with different types of bullets. This caliber ammunition is still in service in Russia and a number of countries that have adopted the AK-74.

The cartridges are packaged in paper bags of 30 pieces or in moisture-proof bags of 120 pieces. Since 1987, cartridges packaged in moisture-proof pouches are equipped with black-oxidized primers. Prior to 1982 the cartridges were marked on the packaging with "5.45 gs PS", and since 1982 with "5.45 PS gs".

Intermediate cartridge with steel-core bullet (7N6,7N

In 1959-60 an extensive scientific and research work was carried out in the USSR to study the killing effect of bullets of the caliber

5.6 mm with muzzle velocities in the range 600-1350 m/s. Copies and analogs of the American ".223 Remington" cartridge were tested. Experimental cartridges were manufactured using a crimped cartridge case of a 7.62 mm automatic rifle cartridge. In 1961, based on the obtained data, the development of an own low-pulse cartridge of 5.6 mm caliber was started. Later on, the caliber of the cartridge was designated by the barrel caliber and was 5.45 mm, although the actual caliber was 5.4 mm due to the chromium plating on the cutting fields. The final appearance of the cartridge was in 1968.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Cartridge length, - mm 56.6-57.0;
Weight of the cartridge, g - 10.2-10.4.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - Sf033fl;
Weight of the powder charge, g - 1.43-1.45;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 2900;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 3,40-3,42; Bullet length, mm - 25,50-25,65; Bullet leading diameter, mm - 5.72-5.75; Bullet transverse load, g/cm^2 - 14.66; Bullet ballistic coefficient, m^2 /kg - 3.77;

Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;

Bullet core material - steel St.10, St.65G, St.70, St.75; Bullet core mass, g - 1.42-1.45.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;

Sleeve length, mm - 39.5-39.7;

Free sleeve volume, cm^3 - 1,74;

Bullet case volume with seated bullet, cm^3 - 1.56;

Bullet case material - lacquered steel; Method of seating the bullet - tight fit.

MORE INFO

Cross-sectional area of the barrel bore (AK-74 rifle) cm^2 - 0.24;

Initial bullet velocity (AK-74 rifle), m/s - 870-900; Bullet muzzle energy (AK-74 rifle), J - 1285.7-1379.1. Marking: *the edge of the muzzle of the cartridge case at the junction of the cartridge case with the bullet is painted.*

The red color of the varnish.

Intermediate cartridge with a high penetration bullet "PP" (7H10, M

In 1987, the PS bullet was upgraded to include a hardened medium-carbon steel core, which improved the penetration characteristics of the bullet. But with the introduction of body armor with titanium plates, the "7H6" cartridge no longer met the requirements for penetration of body armor, even when fired at short ranges. In the late 1980s, specialists from the Central Research Institute for Precision Machine Building developed a cartridge with a bullet with increased penetration.

The PP bullet is designed to hit manpower, including those equipped with personal protective equipment, and lightly armored firearms. The bullet consists of a steel tompak-clad shell, a steel pointed core and a lead jacket. The core is made of steel grade 75, heat treated and provides 60 per cent penetration of a 16 mm steel plate made of steel grade 3KP at a range of 100 meters.

Originally cartridges with the "PP" bullet were produced at cartridge factory no. 270 (Lugansk cartridge factory), but with the collapse of the USSR in 1992, cartridge production was urgently transferred to factory no. 17 (Barnaul Machine-Tool Plant), where it is still in production today. In Russia, the cartridge was adopted as
"GRAU 7H10. The bullets of the first cartridges had a device similar to that of the "7H6" cartridge - in the head part of the bullet, in the gap between the core apex and the bullet casing, there was a void. But in 1994, in order to improve the penetration characteristics of the bullet, an upgraded cartridge was developed
"7H10M", which had a cavity in the head part of the bullet filled with lead. It should be noted that the 7H10 cartridges are somewhat

The 7H6 bullet cartridges are inferior in accuracy. Bullet cartridges "PP" is marked with a distinctive purple lacquer on the joint between the cartridge case and the bullet. The joint between the cartridge case and the primer bullet is painted red.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 10.55-10.64.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - Sf033fl or SSNf 30/3,69; Powder charge mass, g - 1,49-1,51; Charging density, g/cm^3 - 0,967;
Maximum pressure of powder gases, kg/cm^2 - 3000;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 3.56-3.62; Bullet length, mm - 25.50-25.65;
Diameter of the leading part of the bullet, mm - 5.72-5.75;

Bullet transverse load, g/cm^2 - 15.52;
Ballistic coefficient of the bullet, m^2 /kg - 3.58;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - steel St.70, St.75; Bullet core mass, g - 1.72-1.80.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free volume, cm^3 - 1,74;
Bullet case volume with seated bullet, cm^3 - 1.56;
Bullet case material - lacquered steel; Bullet retention method - tight fit.

MORE INFO

Cross-sectional area of the barrel bore (AK-74 rifle) cm^2 - 0.24;
Initial bullet velocity (AK-74 rifle), m/s - 850-870; Bullet muzzle energy (AK-74 rifle), J - 1248.1-1346.8; Marking: *muzzle edge of the cartridge case on the junction of the cartridge case with the bullet The color of the paint is purple*.

Intermediate chuck with the armor-piercing bullet "BP" (7N22)

In 1998, specialists of the Central Research Institute for Precision Machine

Building under the guidance of V.N. Dvoryaninov together with specialists of the Barnaul Machine-Tool Design Bureau.

The cartridge was developed as part of a program to improve the penetration characteristics of 5.45 mm cartridges, and a new cartridge with an armor-piercing bullet was adopted for service under the designation
"GRAU 7H22.

The armor-piercing bullet is designed to engage manpower, including those equipped with personal protective equipment, and lightly armored firearms. The "BP" bullet consists of a tompak-clad steel shell, a steel sharpened core of U12A tool steel, and a lead jacket. The "BP" bullet provides 80 percent of penetration of a 5-mm thick steel 2P armor plate at a range of up to 250 meters, and is considerably superior in its characteristics to the "7H10" cartridge with a bullet with enhanced penetration. Cartridges with the "BP" bullet are marked with a black apex and a black stripe on the package.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 10.60-10.72.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,69;

Weight of the powder charge, g - 1.43-1.45;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 2900;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.30-0.60.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet
weight, g - 3.65-3.69; Bullet
length, mm - 25.50-25.65;
Bullet leading diameter, mm - 5.72-5.75; Bullet
transverse load, g/cm^3 - 15.82; Bullet ballistic
coefficient, m^2 /kg - 3.51;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - tool steel U12A; Bullet core mass, g - 1.75-1.80.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type,
flangeless; Weight of the cartridge case with the
primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet case volume with seated bullet, cm^3 - 1,36;
Bullet case material - lacquered steel; Method of
seating the bullet - tight fit.

MORE INFO

Cross-sectional area of the barrel bore (AK-74 rifle)
cm^2 - 0.24;
m/s, 840-860; Bullet muzzle energy (AK-74), J, 1299.3-1348.8;
Marking: *Bullet tip painted black.*

Intermediate chuck

with an armor-piercing bullet "BS" (7H24)

In 1998 the cartridge with the special armor-piercing bullet "BS" was developed. The cartridge is designed to defeat manpower, including those equipped with personal protective equipment, and lightly armored firearms. The BS bullet consists of a steel, tompak-coated shell, a blunt-edged core of a ceramic metal alloy (tungsten carbide) and a lead jacket.

The cartridge was adopted under the designation *"GRAU 7N24", and* its production was mastered by factories #7 (Amur cartridge factory), #17 (Barnaul cartridge factory) and #539 (Tula cartridge factory).

Cartridges produced in the 1990s by Plant No. 7 were marked identically to the "7H22" cartridge - black bullet tip and red lacquer on the junction of the cartridge case with the bullet and primer. In 2002, factory No. 7 cartridges were produced with black lacquer on the joint between the cartridge case and the bullet and primer.

The rest of the factories *produced* 7H24 cartridges in other years *with red lacquer and no coloring of the bullet tip* and visually indistinguishable from 7H6 cartridges.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 10.60-11.20.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,69;
Weight of the powder charge, g - 1.43-1.46;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 3000;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.30-0.60.

BULLET CHARACTERISTICS

Bullet type - enveloped; Bullet weight, g - 4,0-4,2; Bullet length, mm - 25,50-25,65;
Bullet leading diameter, mm - 5.62-5.65; Bullet transverse load, g/cm^3 - 15.82; Bullet ballistic coefficient, m^2 /kg - 3.51;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - metal-ceramic alloy VK8; Bullet core mass, g - 1,75-1,80.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet case volume with seated bullet, cm^3 - 1,36;
Bullet case material - lacquered steel; Method of seating the bullet - tight fit.

MORE INFO

Cross-sectional area of the barrel bore (AK-74 rifle) cm^2 - 0.24;

Piercing action: 80% 5 mm steel slab of grade 2P at 90^0 at 350 m; Initial bullet velocity (AK-74 rifle), m/s - 820-840; Bullet muzzle energy (AK-74 rifle), J - 1400.3-1410.8; Marking: *muzzle edge of the cartridge case on the joint of the cartridge case with the bullet The red color of the varnish*.

In 2010 the specialists of the Barnaul cartridge factory developed and put into production the modernized round "7N24M", which ensures the penetration of a 5 mm thick armor plate of 2P steel at a range of 500 m. Presumably, the modernized bullet has a plasma-hardened pointed core.

Intermediate cartridge with armor-piercing bullet (

In 2013, Vympel plant together with FGUP TsNIItochmash and TechKomplekt LLC at their own expense completed experimental design work on the production of a new cartridge with the code designation "Needle Gun", under the index *GRAU 7N39*. This ammunition surpasses the existing armor-piercing cartridge "7H24" in its penetration characteristics by 1.8 times. Armor-piercing bullet

"The 7H39 contains a steel shell clad in tompak, a carbide core, and a lead jacket. The core was made of tungsten-cobalt powders with 92% by weight of tungsten carbide and 8% by weight of cobalt, and has

HRA hardness not less than 85.0 and bending strength not less than 2000 MPa. The head part of the carbide core is sharpened.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 10.60-10.72.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,69;
Weight of the powder charge, g - 1.43-1.46;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 3000;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.30-0.60.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 3,9-4,1; Bullet length, mm - 25,50-25,65;
Bullet leading diameter, mm - 5.62-5.65; Bullet transverse load, g/cm^3 - 15.82; Bullet ballistic coefficient, m^2 /kg - 3.5;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - metal-ceramic alloy; Bullet core mass, g - 1.8-1.9.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet casing volume with seated bullet, cm^3 - 1.56;

The cartridge case material is lacquered steel; the bullet retention method is a tight fit.

MORE INFO

Cross-sectional area of the barrel bore (AK-74M rifle) cm^2 - 0.24;

Velocity of bullet (AK-74M), m/s - 830-850; Bullet muzzle energy (AK-74M), J - 1330,1-1342,0; Piercing effect (AK-74M) provides 100%.

penetration:

- 24 mm thick steel plate made of steel grade St.3 at a distance of 100 meters,
- sections of 6B23-1 body armor at a range of 100 meters,
- 5 mm thick steel plate of 2P grade steel at a distance of 550 meters.

Intermediate chuck with reduced velocity bullet "US" (7U1)

After the AK-74 assault rifle was adopted in the late 1970s, work began on the development of a grenade launcher system, similar to the Tishina system. The new 6S1 Kanareyka system included the small 5.45 mm AKS-74UB assault rifle with a silent-fire device and the silent BS-1M 30 mm grenade launcher. For silent firing it was necessary to develop a 5.45 mm cartridge with a bullet with subsonic muzzle velocity.

The "US" bullet cartridge is designed for silent and flameless single-shot firing against manpower and unarmed

The "US" bullet consists of a steel, tombak clad shell. The "US" bullet consists of a steel clad tombak shell, a ceramic metal core made of tungsten carbide-based VK8 alloy, and a lead jacket. The "US" bullet has a weak shoulder line and a slightly larger lead diameter (5.67 mm vs. 5.65 mm), which was dictated by the need to improve powder gasification in the barrel bore.

The cartridge was developed by a group of designers and technologists from the Central Research Institute for Precision Machine Building, including L.I. Bulavskaya and V.A. Nikolaev The development of the cartridge with the "US" bullet began in the late 1970s with the use of "7H6" cartridges with reduced powder load. The first cartridges were marked with a *black bullet tip* with a reinforced lacquer coating of the joint between the cartridge case and the bullet.

To maintain the energy equivalence of the "US" bullet with the "PS" bullet when shooting at ranges up to 400 meters, the bullet was weighted down to 5.1 grams. In the early 1980s, the first rounds with an "US" bullet with a lead core were developed (with distinctive markings by the coloration of the bullet tip in *purple*).

In the mid-1980s, the final version of the cartridge under the index *"GRAU 7U1"* with the "US" bullet with a metal-cored core was adopted for service. The "7U1" cartridges were produced at Plant 270 (Lugansk cartridge factory), but were discontinued in the late 1980s after the decision to field the "6C1" was rescinded. Serial cartridges "7U1" have distinctive markings in the form of *a black top with a green belt* and a black and green strip on the package. Cartridges with "US" bullet are prohibited for use with RPK-74 light machine guns.

In addition to the usual cartridges, according to the industry standard, exemplary cartridges with the bullet "US" were produced, distinguished by the coloring of the bullet tip in white. At present, cartridges "US" with this marking are not produced.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45x39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 10.75-11.00.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; P-45;
Weight of the powder charge, g - 0.25-0.30;
Charging density, g/cm^3 - 0.194;
Maximum pressure of powder gases, kg/cm^2 - 930;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.64-0.94,
– internal diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTICS

Bullet type - jacketed; Bullet
mass, g - 5.0-5.2; Bullet length,
mm - 24.5-24.8;
Bullet leading diameter, mm - 5.72-5.75; Bullet
transverse load, g/cm^2 - 22.3; Bullet ballistic
coefficient, m^2 /kg - 3.11;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,35-1,45;
Bullet core material - steel St.10, VK8; Bullet core
mass, g - 0.69-0.74.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet casing volume with seated bullet, cm^3 - 1.55;
The sleeve material is lacquered steel;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

Cross-sectional area of the barrel bore (AK-74UN2 rifle) with "PBS-4"), cm^2 - 0.24;
Initial bullet velocity (AK-74UN2 assault rifle with PBS-4), m/s - 300-303;
Bullet muzzle energy (AK-74UN2 assault rifle with PBS-4), J225.0-238.7;
Markings: *The tip of the bullet is purple with a green band*.

Intermediate chuck with tracer bullet (7T3,7T3M)

The tracer bullet is designed for target designation and fire adjustment at ranges up to 800 meters, as well as to defeat manpower. The bullet consists of a bimetallic casing, a lead core and an explosive tracer and tracer compound pressed into the casing and a calibration ring. When fired, the combustion of the powder charge ignites the ignition charge,

which ignites a transition charge as the bullet exits the bore, followed by a tracer charge. In flight, the bullet leaves a bright glowing red trace, clearly visible by day and night at ranges of up to 800 meters (and 850 meters for the "TM" bullet).

The cartridge with tracer bullet was developed by a group of TsNIItochmash designers under the leadership of L.I. Bulavskaya. The cartridge was adopted for service under the index *"GRAU 7T3"*. In the late 1990s the cartridge with the upgraded "TM" tracer bullet was adopted. The bullet with the new tracer ensured 50-100 meters off the muzzle of the barrel, and the tracer range was increased from 800 to 850 meters. Currently, tracer bullets are produced by the factory
No. 3 (Ulyanovsk Machine Building Plant). Since the mid-1980s, cartridges for moisture-proof packaging have been produced with oxidized black primers.

The "T" and "TM" bullets have no visible differences and are marked with a green tip and a green stripe on the package. Cartridges are packaged in paper bags of 30 pieces or in moisture-proof bags of 120 pieces each.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;

Chuck length, mm - 56.6-57.0;

Weight of the cartridge, g - 10.23-10.30.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - Sf033fl;
Weight of the powder charge, g - 1.3-1.4;
Charging density, g/cm^3 - 0.915;
Maximum pressure of powder gases, kg/cm^2 - 2900;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 3,20-3,23; Bullet length, mm - 25,0-25,2;
Bullet leading diameter, mm - 5.72-5.75; Bullet transverse load, g/cm^2 - 13.85; Bullet ballistic coefficient, m^2 /kg - 5.01;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - lead with an admixture of 1-2% antimony;
Bullet core mass, g - 1.33-1.35.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet casing volume with seated bullet, cm^3 - 1.53;
The sleeve material is lacquered steel;
The bullet mounting method is a tight fit with crimping edge of the cartridge case muzzle.

MORE INFO

Cross-sectional area of the barrel bore (AK-74 rifle) cm^2 - 0.24;
m/s, 880-910; muzzle energy of bullet (AK-74), J, 1211.1-1337.4;
marking: *the tip of the bullet is painted in green*.

Intermediate chuck
with an armor-piercing tracer bullet (7BT4)

In 2005-06, a cartridge with an armor-piercing tracer bullet "BT" was adopted for service under the index *"GRAU 7BT4"*. The cartridge was developed by the specialists of the Koshkin Design Bureau of Machine-Tool Lines, OJSC. The "BT" bullet is designed to defeat manpower, including those equipped with personal protective equipment, corrective fire and target designation. The "BT" bullet consists of a steel clad Tompak shell, a steel core, a lead head, a tracer charge and a calibrated ring. Eighty percent of the bullets are capable of penetrating 8 mm thick steel plate at a range of 200 m, or 5 mm thick steel plate 2P at 70 m.

Production of cartridges with the bullet "BT" was established at the cartridge factory

No. 3 (Ulyanovsk Machine Building Plant). Serial cartridges are marked identically to the "7T3" cartridge - a green bullet tip and a green stripe on the packaging, although it was originally intended that "BT" bullets would be marked with a green band around the bullet tip. The "BT" bullet is expected to replace the "7T3" and "7T3M" cartridges in production.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;

Chuck length, mm - 56.6-57.0;

Weight of the cartridge, g - 10.14-10.17.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,69;
Weight of the powder charge, g - 1.3-1.4;
Charging density, g/cm^3 - 0.915;
Maximum pressure of powder gases, kg/cm^2 - 2900;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.30-0.60.

BULLET CHARACTERISTICS

Bullet type - jacketed; Bullet weight, g - 3.0-3.1; Bullet length, mm - 25.8-25.9;
Bullet leading diameter, mm - 5.62-5.65; Bullet transverse load, g/cm^2 - 13.85; Bullet ballistic coefficient, m^2 /kg - 5.01;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - lead with an admixture of 1-2% antimony;
Bullet core mass, g - 1.33-1.35.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet casing volume with seated bullet, cm^3 - 1.53;
The sleeve material is lacquered steel;
The bullet mounting method is a tight fit with crimping edge of the cartridge case muzzle.

MORE INFO

Cross-sectional area of the barrel bore (AK-74 rifle) cm^2 - 0.24;
Initial bullet velocity (AK-74 automatic rifle), m/s - 880-915;

Bullet muzzle energy (AK-74 assault rifle), J - 1211.1-1300.4;

Penetrating effect: not less than 80% of steel sheet 8 mm St.3KP at 200 m or 5 mm armor plate 2P at 70 m; Marking: *The apex of the bullet is painted green*.

Intermediate cartridge with reduced ricochet bullet (SRB)

In 2002, cartridges with reduced ricocheting ability of the bullet were developed and adopted by the Russian Interior Ministry. Army ammunition with a steel-core bullet is unsuitable for police operations in cities, since a supersonic bullet with a steel core causes a large number of ricochets when hitting house walls and other hard obstacles. Firing military ammunition can lead to unnecessary collateral damage. In order to minimize ricochets, cartridges for MIA personnel are equipped with lead-core bullets of a similar or similar design to those used in sport-hunting cartridges. When hitting an obstacle, the lead-core bullet crumples, loses velocity quickly and forms fewer fragments upon impact, thus reducing the likelihood of unwanted ricochets and collateral damage.

Since 2002, the cartridges were serially produced at Barnaul Machine-Tool Plant. Earlier, in the 1990s, Amur Cartridge Plant supplied 5.45-mm cartridges with a bullet for the needs of the Interior Ministry.
"PS" with a truncated at the apex of the bullet shell.

Before 2008, BSZ "ORS" cartridges had a commercial bottom marking. In 2008, a special branding containing the letters "ORS" was adopted. The ORS ammunition has a distinctive marking in the form of a purple lacquer on the junction of the cartridge case with the bullet and primer.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 10.45-10.90.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,69;
Weight of the powder charge, g - 1.3-1.4;
Charging density, g/cm^3 - 0.915;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacketed; Bullet mass, g - 3.8-3.9; Bullet length, mm - 25.8-25.9;
Bullet leading diameter, mm - 5.62-5.65; Bullet transverse load, g/cm^2 - 13.85; Bullet ballistic

coefficient, m^2 /kg - 5.01;

Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - lead with an admixture of 1-2% antimony;
Bullet core mass, g - 1.33-1.35.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet casing volume with seated bullet, cm^3 - 1.53;
The sleeve material is lacquered steel.
The bullet mounting method is a tight fit with crimping edge of the cartridge case muzzle.

MORE INFO

Cross-sectional area of the barrel bore (AK-74 rifle) cm^2 - 0.24;
Initial bullet velocity (AK-74 automatic rifle), m/s - 845-855;
Bullet muzzle energy (AK-74 automatic rifle), J - 1331.1-1374.4.

Intermediate Service Cartridge with Expanded Bullet (CH- P)

In 1986 the USSR Air Force adopted a complex "SO-NAZ" (*Small Arms in Portable Emergency Stock*), consisting of a three-barrelled pistol "TP-82" with two caliber barrels for 5.45 mm and 12.5 mm ammunition. The cartridges of the complex "SONAZ" were

The SONAZ complex was developed by a group of TsNIItochmash designers, including P.F. Sazonov (work leader), K.V. Smekaev, V.M. Bobrov, M.E. The SONAZ complex was designed as a weapon for protecting pilots and cosmonauts from wild animals, for hunting food in remote areas, and for giving signals. A special cartridge with an expansive bullet with a steel core was developed for the rifled barrel. The CH-P bullet is designed for game hunting and consists of a steel tampac-lined cap with a truncated tip, a steel core and a bare lead core at the head of the bullet. The expansive bullet provides 8-10 times more effective area compared to the bullet of the standard cartridge "7H6". To avoid confusion with army bullets, the caliber of the hunting cartridges was designated as 5.45x40 mm.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 55,6-55,9;
Weight of the cartridge, g - 10.6-10.8.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade -
VUfl;
Weight of the powder charge, g - 1.38;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 2900;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.47-0.65,
– internal diameter, mm - 0.07-0.15,
– length, mm - 0.85-1.20.

BULLET CHARACTERISTICS

Bullet type - semi-coal; Bullet mass, g - 3.6-3.7; Bullet length, mm - 25.50-25.65; Bullet leading diameter, mm - 5.72-5.75; Bullet transverse load, g/cm^2 - 14.66; Bullet ballistic coefficient, m^2 /kg - 3.77; Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45; Bullet core material - lead with an admixture of 1-2% antimony; Bullet core mass, g - 2.25-2.30.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57; Sleeve length, mm - 39.5-39.7; Free sleeve volume, cm^2 - 1,74; Bullet case volume with seated bullet, cm^3 - 1.56; Bullet case material - lacquered steel; Bullet retention method - tight fit.

MORE INFO

Cross-sectional area of the bore, cm^2 - 0,24; Initial bullet velocity (AK-74), m/s - 825-840; Bullet muzzle energy (AK-74), J - 1269,0-1273,0; Effective firing range: up to 200 m.

Intermediate chuck

with a sport-hunting bullet (GHB)

In the 1990s, cartridge factories in Russia mastered the production of civilian cartridges of 5.45 mm caliber for exports in the Russian Federation.

The cartridge is loaded with several types of lead-core bullets: the "FMJ" "BT" jacket bullet (based on the rounds of the "FMJ" round). The sporting and hunting cartridge "PSO" is loaded with several types of lead-core bullets: the jacketed bullet "FMJ" "BT" (based on the jacket of the PS cartridge or tracer bullet), the expansive bullet "HPBT" and the semi-coated bullet "SPBT". Civilian versions of the cartridge were produced at the Amur, Barnaul and Tula cartridge factories in cooperation with the Ulyanovsk cartridge factory under the "WOLF" brand (Ulyanovsk cartridges differ in having a dot in the bottom marking of the cartridge case after the caliber marking). Ammunition of the same type, but produced by different factories, varies considerably in specifications.

The PSO cartridges are produced with steel cartridges, but with different coatings: phosphate-lacquer, phosphate-polymer and galvanized. The exception is the brass cartridge cases for the Boxer primer, produced by the Tula cartridge factory at the order of the Czech company.
"Sellier & Bellot, but not redeemed and disposed of by making souvenirs of TPZ.

The only exceptions are the cartridges issued by the Barnaul cartridge factory in the 1990s and early 2000s, with military style branding.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 55,6-55,9;
Weight of the cartridge, g - 10.5-11.0.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade -
VUfl;
Weight of the powder charge, g - 1.38-1.41;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 2900;
The shape and size of the powder grain is a cylinder with a channel:

– outer diameter, mm - 0.47-0.65,
– internal diameter, mm - 0.07-0.15,
– length, mm - 0.85-1.20.

BULLET CHARACTERISTICS

Bullet type - semi-coal; Bullet mass, g - 3.56-4.0; Bullet length, mm - 25.50-25.65;
Bullet leading diameter, mm - 5.72-5.75; Bullet transverse load, g/cm^2 - 14.66; Bullet ballistic coefficient, m^2 /kg - 3.77;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - lead with an admixture of 1-2% antimony; Bullet core mass, g - 2.26-2.55.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Bullet case volume with seated bullet, cm^3 - 1.56;
Bullet case material - lacquered steel; Bullet retention method - tight fit.

MORE INFO

Cross-sectional area of the bore, cm^2 - 0,24; Initial bullet velocity (AK-74), m/s - 860-880; Bullet muzzle energy (AK-74), J - 1285,0-1481,0; Effective firing range: up to 300 m.

CARTRIDGE OPTIONS

PSO cartridge with brass cartridge case for Boxer primer. "TPZ" by order of Sellier & Bellot

Cartridge with "SP" "BT" bullet. "BTZ."

Cartridge with "HP BT" bullet. Steel cartridge case with phosphate-polymer coating. "TPZ."

Cartridge with "FMJ" "BT" bullet. The cartridge case is steel with phosphate-polymer coating. "UMZ."

Intermediate underwater bullet cartridges (MPS) and (MPS-T)

In 1970, specialists of the Central Research Institute of Precision Machine Building (TsNIItochmash), commissioned by the USSR Navy, began developing a complex of special automatic underwater weapons in addition to the submarine pistol and 4.5 mm SPS ammunition adopted for military service. The automatic weapon system included an underwater machine gun and underwater assault rifle "AG-022" for a more powerful cartridge of 5.66 mm caliber. Development of the underwater machine gun was soon discontinued, and in 1975 the AG-022 submachine gun was adopted for service as the APS (Underwater Firing Automatic Gun).

The cartridge for underwater shooting consists of a lacquered steel cartridge case, unified with the 5.45x39 caliber cartridge, steel

The bullet is a single-channel cylinder, phlegmatized special, which replaced the earlier "VT" (Heavy Bullet Rifle) brands (4/1 flSP). The bullet has a truncated cone apex, which allows the formation of a cavity around the bullet to stabilize its movement under water.

Range and accuracy under water depend on loading depth. In exceptional cases, MPS cartridges can be fired in the air, but the long bullet quickly loses stability in the air.

The junction of the cartridge case with the primer and bullet is painted black with sealant. The steel bullet is varnished green or dark brown (the varnish shade depends on its consistency).

MPS" cartridges were produced at Plant No. 711 (Klimov Stamping Plant) and Plant No. 38 (Yuryuzan Mechanical Plant), using cartridge cases from Plant No. 3 (Ulyanovsk Machine Building Plant).

In the late 1980s the MPST cartridge with a tracer bullet was adopted for service. In the 1990s the KBP specialists developed an experimental version of the cartridge with an armor-piercing bullet "MPS-B".

CARTRIDGE CHARACTERISTICS

The caliber is 5.66 × 39 MPS;
Chuck length, mm - 149,6-150,3;
Cartridge weight, g - 27.5-28.2.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - 4/1 flSP;
Weight of the powder charge, g - 1.40-1.42;
Charging density, g/cm^3 - 0.95;
Maximum pressure of powder gases, kg/cm^2 - 3100;
The shape and size of the powder grain is a tube:

– outer diameter, mm - 0.85-1.25,
– inner diameter, mm - 0.25-0.35,
– length, mm - 5,5-7,5.

BULLET CHARACTERISTICS

Bullet type - hollow-point, one-piece; Bullet weight, g - 20.2-20.7;
Bullet length, mm - 119.8-120.2;
Leading bullet diameter, mm - 5.64-5.66; Bullet transverse load, g/cm^2 - 81.47; Bullet material - lacquered steel.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Bullet casing volume with seated bullet, cm^3 - 1.5;
The sleeve material is lacquered steel;
The method of attaching the bullet is a tight fit and crimping the edge of the cartridge case muzzle.

MORE INFO

Cross-sectional area of the barrel bore (APS rifle), cm^2 - 0.25;
Initial velocity of the bullet (automatic rifle "APS", air), m/s - 350-365;
Bullet muzzle energy (automatic rifle "APS", air), J - 1237.3 - 1365.6;
Average R_{50} accuracy in the air at a range of 5 m, cm $\leq$5.0; Maximum range obtained during the GI:
– at a depth of 5 m - 30 m,
– at a depth of 20 m - 19 m,
– at a depth of 40 m - 11 m,
– in the air - 100 m.

5.66x39 underwater cartridge with tracer bullet (MPS-T)

The cartridge "MPST" is designed for target designation and correction of fire when firing from the underwater submachine gun "APS". The cartridge consists of a steel lacquered cartridge case with a charge of special powder of "4/1 flSP" brand, a steel needle-shaped bullet with a brass cup with a tracer pressed into it on the tail part. The bullet is stabilized in flight by the cavitation effect. The range and accuracy of tracer fire under water depend on the depth of the dive. In exceptional cases it is possible to shoot MPST ammunition in the air, but the long bullet quickly loses its stability in the air.

The steel bullet is lacquered and its tip is painted green. The cartridges are packed in unmarked cardboard boxes with a plastic divider for 26 pieces. Cartridges are packed in 8 carton boxes in metal boxes (208 cartridges). The wooden box contains 416 rounds. MPST cartridges were produced at plant No. 711 (Klimovsk Specialized Ammunition Plant).

CARTRIDGE CHARACTERISTICS

The caliber is 5.66×39 "MPS-T";
Chuck length, mm - 149,6-150,3;
Cartridge weight, g - 26.5-27.0.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - 4/1 flSP;
Weight of the powder charge, g - 1.42-1.45;
Charging density, g/cm^3 - 0.97;
Maximum pressure of powder gases, kg/cm^2 - 3100;
The shape and size of the powder grain is a tube:

– outer diameter, mm - 0.85-1.25,
– inner diameter, mm - 0.25-0.35,
– length, mm - 5,5-7,5.

BULLET CHARACTERISTICS

Bullet type - hollow-point, one-piece; Bullet weight, g - 18.6-18.8;
Bullet length, mm - 119.8-120.2;
Diameter of the leading part of the bullet, mm - 5.64-5.66;
The bullet material is lacquered steel.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
Casing volume with seated bullet, cm^3 - 1,5; Bullet transverse load, g/cm^2 - 74,72; Casing material - lacquered steel;
The method of attaching the bullet is a tight fit and crimping the edge of the cartridge case muzzle.

MORE INFO

The cross-sectional area of the barrel bore (automatic rifle "APS"), cm^2 - 0.25;
Initial velocity of the bullet (automatic rifle "APS", air), m/s - 350-360;
Bullet muzzle energy (automatic rifle "APS", air), J - 1139.3 - 1218.2;
Average R_{50} accuracy in the air at a range of 5 m, cm ≤10.0; Maximum range obtained during the GI:
– at a depth of 5 m - 28 m;
– at a depth of 20 m - 18 m;
– at a depth of 40 m - 10 m;
– in the air - 100 m;
Markings: *The tip of the bullet is painted green*.

5.66x39 underwater training cartridge (MPS- U)

The "MPS-U" training cartridge is designed for training in the handling of weapons and ammunition. The cartridge consists of a steel lacquered cartridge case and a steel needle-shaped bullet. The cartridge case has a reinforced bullet restraint by crimping the cartridge case muzzle into the two annular grooves on the bullet. The internal volume of the cartridge case is filled with epoxy resin. The bullet also has a third annular groove recessed in the epoxy resin to improve the bullet's retention in the training cartridge.

Manufacturers of weapons designed for 5.66x39 mm cartridges use technological cartridges, which are manufactured by deburring the cartridge cases and also by placing vertical grooves on the casing of the cartridge case.

The packaging of cartridges is marked with the inscription "TRAINABLE".

CARTRIDGE CHARACTERISTICS

The caliber is 5.66 × 39;
Chuck length, mm - 149,6-150,3;
Cartridge weight, g - 25.7-26.1.

BULLET CHARACTERISTICS

Bullet type - hollow-point, one-piece; Bullet weight, g - 20.2-20.7;
Bullet length, mm - 119.8-120.2;
Diameter of the leading part of the bullet, mm - 5.64-5.66;
The bullet material is lacquered steel.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;

Free sleeve volume, cm^3 - 1,74;
The volume of the cartridge case with a seated bullet, cm^3 - 1.5;
Bullet transverse load, g/cm^2 - 74.72;

The sleeve material is lacquered steel;

The method of attaching the bullet is a tight fit and crimping the edge of the cartridge case muzzle.

MORE INFO

Marking: *three longitudinal grooves on the sleeve*.

CARTRIDGE OPTIONS

Training cartridge with a lacquered steel casing (HS)

Intermediate underwater cartridges (ISP) and (ISP-UD)

In 2005, the team of designers of SUE KBP and its branch "The TsKIB SOO" has developed a special underwater cartridge "The ADF rifle was developed by KBP specialists to replace the APS assault rifle, which is in service with combat swimmers. The ADS rifle was developed by KBP specialists to replace the APS assault rifle that is in service with combat swimmers. The advantage of the ADS rifle is that it can be fired both in the air (with standard ammunition) and under water with special "PSP" ammunition. In order to create a universal dual-caliber rifle, it was necessary to develop a cartridge for underwater firing that did not differ in size from the standard 5.45-mm cartridge.

The PSP bullet has a spherical shape of variable diameter, a truncated cone-shaped tip (cavitator) and a conical bottom part. The cavitator of the bullet has an expanding curvilinear contour shape. The bullet is fitted with a glass-filled polyamide blasting sleeve, which blows out the powder gases in the bore and guides the bullet as it enters the chamber. Additionally, the bullet is guided through the bore by two lead rings. The bullet is seated in a conical recess in the bottom of the cartridge case and secured by a reinforced compression of the cartridge case muzzle. The propellant charge was replaced by a more advanced CENF 45/3.98, placed in the cavity between the bullet body and the walls of the cartridge case. The primer-igniter of "PSP" ammunition has a strengthened anchorage with a three or four point punch, and the primer of "PSP-UD" ammunition has no such anchorage.

PSP cartridges have been produced since about 2007 using steel cartridges (7Ch9) produced by Tula cartridge factory 539.

The current range of cartridges includes:

- PSP underwater cartridge with a tungsten-alloy bullet,
- PSP-UD training cartridge with a bronze bullet,
- test cartridge "UZ" (charge gain of 1.2).
- training cartridge,

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 21-22.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - CENF 45/3,98;
Charging density, g/cm^3 - 0.915;
Maximum pressure of powder gases, kg/cm^2 - 3100;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.65-0.95.

BULLET CHARACTERISTICS

Bullet type - hollow-point, one-piece; Bullet weight, g - 16.0-16.4;
Bullet length, mm - 52.8-53.2;
Diameter of the leading part of the bullet, mm - 5.62-5.65;
The bullet material is hard alloy (tungsten).

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
The sleeve material is lacquered steel;
The method of attaching the bullet is a tight fit and crimping the edge of the cartridge case muzzle.

MORE INFO

Cross-sectional area of the barrel bore cm^2 - 0.24; Initial velocity of the bullet (automatic rifle "ADS"), m/s - 333; Maximum range of impact obtained during the test:
– at a depth of 0.5 m - 25 m,
– at a depth of 5 m - 25 m,

– at a depth of 20 m - 18 m.

Bullet energy at 20 m range and 5 m depth - 167 J; Bullet specific energy at 20 m range and 5 m depth - 70 kg/cm^2 .

5.45x39 submersible cartridge PSP-UD

The PSP-UD cartridge is designed for training and combat use and can be used to engage enemy combat swimmers by firing a two-magazine rifle from an underwater position
"ADS." The cartridge consists of a standard steel cartridge case of 5.45 mm caliber, a powder charge and a special bullet weighing 8 grams made of bronze.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 13,5-14,5.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand -
CENF 45/3,98;
Charging density, g/cm^3 - 0.915;
Maximum pressure of powder gases, kg/cm^2 - 3100;
The shape and size of the powder grain is ellipsoid-spheroid:
– outer diameter, mm - 0.65-0.95.

BULLET CHARACTERISTICS

Bullet type - hollow-point, one-piece; Bullet
weight, g - 7.8-8.2;
Bullet length, mm - 52.8-53.2;

Diameter of the leading part of the bullet, mm - 5.62-5.65;
The material of the bullet is bronze.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
The sleeve material is lacquered steel;
The method of attaching the bullet is a tight fit and crimping the edge of the cartridge case muzzle.

MORE INFO

Cross-sectional area of the barrel bore cm^2 - 0.24; Initial velocity of the bullet (automatic rifle "ADS"), m/s - 430; Maximum range of impact obtained during the test:

– at a depth of 0.5 m - 10 m;
– at a depth of 5 m - 10 m;
– at a depth of 10 m - 8 m;

The energy of the bullet, at a range of 10 m and a depth of 5 m - 78 J;
The specific energy of the bullet, at a range of 10 m and a depth of 5 m is 33 kg/cm^2 .

5.45x39 submersible cartridge PSP-U

The cartridge is designed to train personnel in the handling of weapons and ammunition. The PSP-U cartridge consists of a standard steel cartridge case with a chilled primer and a steel bullet weighing about 4 grams. Presumably, the cartridge is used as a showpiece.

High pressure intermediate cartridge "VD"

High-pressure cartridges are designed to test the strength of gun barrels in factory tests. When fired, the high-pressure cartridge exerts increased pressure on the walls of the bore. The "VD" ammunition is loaded with a steel-core bullet. The bullet has an enlarged leading part due to the absence of a tapered bottom part of the bullet. VD cartridges are packaged in 30-pack bundles and the packaging is labeled "HIGH PRESSURE". The bullet of the "VD" cartridge is painted yellow.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Cartridge length, mm - 56.61-57.04;
Weight of the cartridge, g - 10.6-10.7.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - Sf033fl;
Weight of the powder charge, g - 1.43-1.45;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 4500;
The shape and size of the powder grain is ellipsoid-spheroid:
– outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet
weight, g - 3,50-3,52; Bullet
length, mm - 25,50-25,65;
Diameter of the leading part of the bullet, mm - 5.72-5.75;
Bullet transverse load, g/cm^2 - 14.66;

Ballistic coefficient of the bullet, m^2 /kg - 3.77;
The bullet casing material is steel, clad in tompak.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^2 - 1,74;
Bullet case volume with seated bullet, cm^3 - 1.56;
Bullet case material - lacquered steel; Bullet retention method - tight fit.

MORE INFO

Markings: *The bullet is painted yellow*.

Intermediate chuck with an amplified charge "UZ" (7Sh4)

The "UZ" ammunition is designed to test the strength of the locking mechanism of small arms in a factory test. UZ ammunition develops more pressure due to a reinforced powder load. The cartridge is loaded with a steel-core "PS" bullet.

UZ ammunition is packaged in cardboard boxes or paper bags of 30 pieces and the package is labeled "EXTENSIVE FILL". The bullet is colored black.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;

Chuck length, mm - 56.6-57.0;
Cartridge weight, g - 10.5-10.6.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - Sf033fl;
Weight of the powder charge, g - 1.43-1.45;
Charging density, g/cm^3 - 0.93;
Maximum pressure of powder gases, kg/cm^2 - 3500;
The shape and size of the powder grain is ellipsoid-spheroid:
– outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 3,40-3,42; Bullet length, mm - 25,50-25,65;
Bullet leading diameter, mm - 5.72-5.75; Bullet transverse load, g/cm^2 - 14.66; Bullet ballistic coefficient, m^2 /kg - 3.77;
The bullet casing material is steel, clad in tompak.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^2 - 1,74;
Bullet case volume with seated bullet, cm^3 - 1.56;
Bullet case material - lacquered steel; Method of seating the bullet - tight fit.

MORE INFO

Markings: *The bullet is painted black*.

Intermediate chuck

"Exemplary."

For the purpose of measuring complex shooting, certification of ballistic weapons and new ammunition samples, exemplary ammunition is used.

REQUIREMENTS FOR THE ELEMENTS OF EXEMPLARY CARTRIDGES:

- *Sleeves* for the assembly of sample cartridges are selected from the number of cartridges manufactured in the same process equipment chain and accepted by the "Quality Control" of the enterprise and the customer's representative. Sleeves with the number of ignition holes less or more than two are not allowed.
- *Bullets* for sample cartridge assembly must be of the same batch, meet half tolerances for driving diameter and weight, measured symmetrically to the mean value of the drawing, and meet the requirements of the technical specifications for the other parameters. All bullets are checked for diameter and weight.
- *The igniter primers* for the sample cartridges must be from the same batch and must meet the specifications and specifications.
- *Gunpowder* for exemplary cartridges is manufactured according to the specifications established for serial cartridges, taking all possible measures in the production process (stricter choice of input materials, compliance with technological regulations, etc.) to ensure that the powder with the most stable physicochemical and ballistic characteristics is obtained.

The shelf life of exemplary ammunition should not exceed 5 years from the date of their ballistic performance. The ammunition is marked with "REMARKABLE" on the packaging.

Model cartridge "7H10" from factory #17, 1996.

Sample cartridge with "US" bullet

Intermediate blank cartridge with a dummy bullet (7X3)

In the late 1970s, V.I. Volkov and B.A. Johansen developed a blank cartridge in addition to live ammunition at the TsNIItochmash. The blank cartridge is designed to simulate the sound effect of firing all types of standard 5.45 mm ammunition. The cartridge is used with a screw-on muzzle, which provides the powder gas pressure required to operate the weapon's automatic system and destroy the plastic bullet imitator.

The blank cartridge is filled with a plastic surrogate bullet, which fractures in the muzzle of the barrel as it passes through the bore. Considerable development effort was spent on finding a suitable chemical composition for the plastic. The blank cartridge with a plastic simulant was adopted under the designation *"GRAU 7X3"*.

Blank cartridges have no special markings. Prior to the 1980s, the joint between the cartridge case and the plastic bullet imitator was painted

The firing pin junction of the primer was not varnished until recently. Until recently, the primer- primer junction was not varnished.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.0-56.3;
Weight of the cartridge, g - 6.4-6.6.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - Sf035fl or P-45;
Weight of the powder charge, g - 0.60-0.61;
Charging density, g/cm^3 - 0.356;
Maximum pressure of powder gases, kg/cm^2 - 950.

BULLET CHARACTERISTICS

Bullet type - uncapitalized; Bullet mass, g - 0.24-0.25; Bullet length, mm - 21.2-21.6;
Diameter of the leading part of the bullet, mm - 5.5-5.6;
The bullet material is polymer.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
Free sleeve volume, cm^3 - 1,74;
The volume of the cartridge case with a seated bullet, cm^3 - 1.71;
The sleeve material is lacquered steel;
Bullet mounting method - tight fit and segmental crimping of the cartridge case muzzle and 4-point core.

MORE INFO

Markings: *White plastic bullet*.

Army blank cartridges are produced at plants No. 539 (Tula Ammunition Plant), No. 7 (Amur Ammunition Plant) and No. 17 (Barnaul Ammunition Plant). In addition to military versions of the cartridge,
"TPZ has mastered the production of export blank cartridges for civilian use with a phosphate-polymer-coated steel casing.

Noise cartridges were produced under the brand name "WOLF" (and now under the brand name Tulammo). In noise cartridges, the joint between the cartridge case and the plastic bullet imitator is painted with green lacquer. Also production of the civilian version of the blank cartridge was mastered by Barnaul Machine-Tool Plant.

In the late 1970s, as part of preparations for the Summer Olympics in Moscow, the Central Research Institute for Precision Engineering developed the Vitrina grenade launcher system at the request of the KGB. Special 50-mm Vitrina-G gas grenades were fired using special blank cartridges from a grenade launcher mounted on the barrel of the AKS-74U. The Vitrina blank cartridge was a cartridge case, made from a standard automatic rifle cartridge, with shortened muzzle and shrunken sprocket. Blank cartridges were loaded into standard automatic rifle magazines. The ammunition was packaged in cardboard boxes marked "Vitrina Ammunition".

In the late 1990s the Barnaul Machine-Tool Plant mastered the production of an upgraded blank cartridge of 5.45 mm caliber. The new blank cartridge has no plastic bullet and is made of an elongated steel cartridge case with a muzzle crimped by a star. The blank cartridge of such design was developed in the 70s along with 7H6 and 7T3 cartridges, and experimental batches of cartridges were produced at Tula cartridge factory, but the cartridge was adopted only in the early 2000s under the name *"GRAU 7X3M"*.

Intermediate chuck

"Training" (7X4)

In the 1970s, V.I. Volkov, a designer of the Central Research Institute for Precision Machine Building, developed a 5.45 mm training cartridge. The training cartridge is designed to teach the rules and techniques of handling weapons and ammunition. The training cartridge consists of live ammunition components, but does not contain a powder charge, the primer is cauterized and the bullet with a steel core is "PS".

A training cartridge is required to withstand a minimum of 50 loading cycles, for which purpose the cartridge has a reinforced bullet retention. Training cartridges are marked with four vertical grooves

on the casing of the cartridge case. For training cartridges, the joint between the cartridge case and the bullet and the cartridge case is not varnished. The packaging of the ammunition is marked with the word "TRAINING".

The factory-operated test gun manufacturers use technological versions of the cartridges. Technological cartridges are usually produced from live ammunition by means of a hunting process (case drilled, primer pierced) and sometimes electrolytically coated with an additional anti-corrosion coating (zinc plating, phosphating, chromium plating or nickel plating). Also, in the manufacture of weapons in the absence of sufficient ammunition, cartridge pellets were made - a hollowed-out model of brass or steel, repeating the geometry of a live cartridge.

CARTRIDGE CHARACTERISTICS

The caliber is 5.45×39;
Chuck length, mm - 56.6-57.0;
Weight of the cartridge, g - 8.9-9.0.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet
weight, g - 3,40-3,42; Bullet
length, mm - 25,50-25,65;
Diameter of the leading part of the bullet, mm - 5.72-5.75;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 1,30-1,45;
Bullet core material - steel St.10; Bullet core
mass, g - 1,42-1,45.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type,
flangeless; Weight of the cartridge case with the
primer, g - 5.50-5.57;
Sleeve length, mm - 39.5-39.7;
The sleeve material is lacquered steel;
The method of attaching the bullet is a tight fit and crimping of the cartridge case muzzle.

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Intermediate cartridges 7.62x39

Since the early 1940s, the Soviet Union has been working on an intermediate cartridge for the advanced carbine and automatic rifle. The intermediate cartridge's bullet has a stable trajectory and the cartridge has a lower weight compared to the rifle cartridge, which allowed for the development of lighter weapons. The designers were tasked with developing a cartridge with a bullet energy of at least 196 J at a range of 1,000 meters, fired from a 500-520 mm barrel with a weight of 15-17 grams. Experimental development began with the testing of 7.62mm and 6.75mm cartridges. By October, 1945 the ammunition of various designs passed the range tests. According to the results of the tests the ammunition, developed by the OKB-44 group of designers under the leadership of N. M. Elizarov and B. V. Semin was recommended for serial production.

To eliminate flaws identified during the tests the casing of the 7.62x41 mm cartridge was shortened to 38.9 mm, wall thickness and ogival part of the bullet were changed. By 1948, bullets with a steel core and tapered bottom part of the bullet were produced, providing the "PS" bullet with better armor-piercing and ballistic characteristics compared to a bullet

with a lead core.

In 1949 the cartridge with steel-core bullet was adopted for service under the index *"GAU 57-N-231S"* together with the automatic rifle "AK-47." But the production of setting batches of cartridges was started in 1948 at plant #539. By 1948, due to the shortage of bi-metal supplied to the USSR under the Lend-Lease program, cartridges were produced using cheaper brass-coated steel cartridge cases. Production of brass casing continued until 1952, when the Soviet industry began producing domestic bimetal. In the mid-1960s, the industry mastered the production of steel sleeves with phosphate-lacquer coating.

In 1961-62 TsNIItochmash developed pilot rounds with a "PS" bullet with a lightweight aluminum alloy casing (conventional designation GA). The aluminum casings were graphite-coated. The cartridges were loaded with PSL bullets with a steel core, Boxer system primer and experienced spherical powder. No copper alloys were used in the cartridge design to prevent electrical and chemical corrosion, so the primer cap was made of aluminium alloy, and the tom-paste coating on the bullet jacket was replaced with a special green paint. The 1961 cartridges from factory No. 61 had a pink sealing varnish and the 1962 cartridges had a special white sealing varnish.

The cartridge design has undergone minor changes since then. For example, instead of the VU Fl (short-cut phlegmatized rifle powder), spherical Sf03fl powder (spherical with a 0.3 mm thick burning roof, phlegmatized) was used.

After 1984, the gunpowder brand Sf03fl was replaced with the spherical powder CCNf 30/3,97, the first letter indicating its function (C - for small arms), the second - the shape of the powder grain (C - spheroid), the third - the presence of nitroglycerin (H), the fourth - the presence of phlegmatizer (F), 30 - the thickness of the burning material (0,3 mm), 3,97 - calorific value MJ/kg.

Since 1989, the PS bullets have been equipped with a heat-strengthened core of steel St.70, which allowed them to increase their armor-piercing characteristics.

A fairly wide range of ammunition with special action bullets was developed in this caliber: armor-piercing, incendiary, tracer, armor-piercing incendiary bullet, etc. In the early 1990s, hunting versions of this cartridge were launched in Russia.

Cartridges of this caliber and Kalashnikov AK-47 and "AKMs have been adopted for service in many countries of the world, where they have mastered the production of their own range of ammunition of this caliber.

Intermediate chuck

with steel-core bullet (57-H-231C)

The design of the intermediate cartridge with "PS" bullet with steel core was finalized by 1948, and in 1949 the cartridge was adopted for service under the index *"GAU 57-N-231S"*. The "PS" bullet is designed to defeat manpower located openly and behind cover, pierced by an ordinary bullet. The bullet consists of a steel tompak-clad shell and a steel core in a lead jacket.

Cartridges with the PS bullet were filled with various grades of pyrox silicon powders. With the advent of spherical powders, the design of the bullet was slightly modified - a ledge appeared in its bottom part to prevent powder grains from being jammed between the bullet and the muzzle of the cartridge case during cartridge firing.

The cartridges of the 1948 installation batch had distinctive markings - the color of the bullet tip was yellow. Later production cartridges with the "PS" bullet had no distinctive markings. Since 1962, cartridges of this calibre have been marked on the butt

The bullet and primer cartridge cases began to be varnished. In 1962-64. lacquer in purple, and later in burgundy.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-56,0;
Weight of the cartridge, g - 16.3-16.8.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade -
VUfl;
Weight of the powder charge, g - 1.56-1.60;
Charging density, g/cm^3 - 0.8;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is a cylinder with a channel:

– outer diameter, mm - 0.47-0.65,
– internal diameter, mm - 0.07-0.15,
– length, mm - 0.85-1.20.

BULLET CHARACTERISTICS

Bullet type - jacketed; Bullet
mass, g - 7.75-8.05; Bullet length,
mm - 26.28-26.80;
Bullet leading diameter, mm - 7.87-7.92; Bullet
transverse load, g/cm^2 - 16.34; Bullet ballistic
coefficient, m^2 /kg - 4.08;

Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.05-2.25;
Bullet core material - steel St.10; Bullet core mass, g - 3.52-3.55.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;
The volume of the cartridge case with a seated bullet, cm^3 - 2.01;
Material of sleeve - steel, plated by tompak; steel, plated by brass; steel, coated by varnish;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm2 - 0.48;
Initial bullet velocity (AKM rifle), m/s - 710-725;
Bullet muzzle energy (AKM assault rifle), J, 1953.4-2115.6.

CARTRIDGE OPTIONS

1948 experimental cartridge (tip yellow, brass-plated steel sleeve)

Cartridge with "PS" bullet with purple lacquer

(lacquered steel sleeve)

Cartridge with "PS" bullet with red lacquer (lacquered steel sleeve)

Cartridge with "PS" bullet with red lacquer (GZh)

Cartridge with PSL bullet (aluminum casing)

Intermediate cartridge with tracer bullet

"T-45, T-45M (57-N-231P, 7M

The tracer bullet is designed to target and correct fire at ranges up to 800 meters, as well as to defeat manpower. The bullet consists of a bimetallic shell, a lead core, a bimetallic cup with ignition, transition and tracer components pressed into it and a calibration ring. The combustion of the powder charge ignites the ignition charge, which ignites the transition charge and then the tracer charge as the bullet exits the bore. In flight, the bullet leaves a bright luminous red trace, clearly visible during the day and at night at ranges of up to 800 meters.

The cartridge with the tracer bullet "T-45" was adopted for service in 1949 under the index *"GRAU 57-T-231P"*. Until 1952 the cartridges were produced with steel brass casing, until the production of cartridges with bimetallic casing and later with steel lacquered casing was mastered.

In 1973, specialists of the Central Research Institute of Fine Arts under the guidance of V.M. Sabelnikov developed an upgraded tracer bullet "T-45M". The design of the bullet differed in the presence of a ledge and a cup with a tracer pressed into it without a calibration ring in the bullet. The cartridge was indexed *GRAU 57-T-231PM*, but it was never put into production.

In the late 1990s TsNIItochmash specialists L.I. Novozhilova and T.P. Vasilyeva developed a cartridge with the modernized bullet "T-45M", which was accepted for service under the index *"GRAU 57-T-231PM1"*.

In the upgraded bullet, the tracer burn was moved to a range of 50-120 meters from the center of the barrel, and the tracer range was increased from 800 to 850 meters.

A tracer bullet has a distinctive marking in the form of a green color on the top of the bullet. In 1963, for a short time tracer bullets were marked with a green lacquer on the joint between the cartridge case and the bullet and primer.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;

Chuck length, mm - 55,4-56,0;

Weight of the cartridge, g - 16.1-16.5.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - VUfl;

Weight of the powder charge, g - 1.56-1.61;

Charging density, g/cm^3 - 0.83;

Maximum pressure of powder gases, kg/cm^2 - 2800;

The shape and size of the powder grain is a cylinder with a channel:

– outer diameter, mm - 0.47-0.65,

– internal diameter, mm - 0.07-0.15,

– length, mm - 0.85-1.20.

BULLET CHARACTERISTICS

Bullet type - jacketed; Bullet mass, g - 7,45-7,67; Bullet length, mm - 27,48-28,00;

Bullet leading diameter, mm - 7.87-7.92; Bullet cross load, g/cm^2 - 15.57; Bullet ballistic coefficient, m^2 /kg - 5.39;

Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.18-2.25;

Bullet core material - lead with an admixture of 1-2% antimony;

Bullet core mass, g - 2.82-2.95.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07;

Sleeve length, mm - 38.36-38.70;

Free sleeve volume, cm^3 - 2,5;

The volume of the cartridge case with a seated bullet, cm^3 - 1.95;

Material of sleeve - steel, plated by tompak; steel, plated by brass; steel, coated by varnish;

The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle),

cm^2 - 0.48;

m/s, 715-725; Bullet muzzle energy (AKM), J, 1904.3-2015.8; Tracer accuracy: at least 90% at 250 m range and 80% at long range; Bullet muzzle energy (AKM), J, 1904.3-2015.8; Tracer velocity (AKM), m/s.

The distance is 800 m;

Markings: *Apex of the bullet is painted green or the muzzle of the case and the edge of the primer are varnished green*.

CARTRIDGE OPTIONS

Cartridge with brass casing from 1949-51.

Intermediate chuck with armor-piercing incendiary bullet "BZ" (BZ)

The BZ bullet is designed to ignite flammable liquids and disable manpower behind light armored cover at ranges of up to 300 meters.

The bullet consists of a steel bimetallic shell and a tombako tip, a steel core with a lead jacket and incendiary composition No. 7 in a lead tray. When the bullet strikes the armor, the incendiary composition is ignited. The flame penetrates through the hole pierced by the steel core and ignites the combustible material behind the barrier.

Until 1952 cartridges with the bullet "BZ" were produced with steel brass casing, and later with bimetallic casing

cartridge cases. The cartridges were produced at plant #711 (Klimov Stamping Plant) using cartridge cases from plant #539 (Tula Ammunition Plant) and their own production. Production of the cartridges continued at least through 1961 (*last changes in the drawings are dated 1967-72, but samples from these years are unknown*).

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-56,0;
Weight of the cartridge, g - 15.65-15.80.

CHARACTERISTICS OF THE POWDER CHARGE:

Powder type - smokeless, pyroxylene; Powder grade -
VUfl;
Weight of the powder charge, g - 1.57-1.59;
Charging density, g/cm^3 - 0.8;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.47-0.65,
– internal diameter, mm - 0.07-0.15,
– length, mm - 0.85-1.20.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet mass,
g - 7.47-7.87;

Bullet length, mm - 27.18-27.70;
Bullet leading diameter, mm - 7.87-7.92; Bullet transverse load, g/cm^2 - 15.97; Bullet ballistic coefficient, m^2 /kg - 4.29;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.10-2.25;
Bullet core material - tool steel U12, U12A; Bullet core mass, g - 3.2-3.6.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;
The volume of the cartridge case with a seated bullet, cm^3 - 1.97;
Material of the sleeve - steel, plated by tompak; lacquered steel;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48;
Initial bullet velocity (AKM rifle), m/s - 725-740; Bullet muzzle energy (AKM rifle), J - 1909.4-2068.3; Penetration: 80% penetration of 7 mm thick steel plate at 100 м;
Markings: *The tip of the bullet is painted black with a red band.*

CARTRIDGE OPTIONS

Cartridge case with brass casing, 1949-51.

Intermediate chuck
with incendiary bullet "3" (57-Z-231)

Incendiary bullet "Z" is designed to ignite combustible materials (gasoline, kerosene) in iron tanks with walls up to 3 mm thick, as well as easily ignitable materials (straw roofs, dry grass, cellulose, etc.) at ranges up to 700 meters.

The bullet consists of a bimetallic casing, a tombak tip, an incendiary compound, a steel core in a lead jacket and a cup with tracer compound. The incendiary composition in the bullet is ignited on impact with the obstacle. The incendiary bullet has a tracer effect. The trajectory of the bullet is clearly visible during the day and at night at distances of up to 700 meters.

From 1949 to 1951 inclusive, cartridges with the "Z" bullet were produced with steel brass casings and later with bimetal casings. In 1952 the bullet was modernized - the radius of the ogival part of the bullet was changed. Production of the cartridges was conducted by plant #711 (Klimovsk Stamping Plant) using cartridge cases from plant #539 (Tula cartridge factory) and continued until the end of the 1950s, with last changes to the drawing made at least in 1967.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-56,0;
Weight of the cartridge, g - 14.7-15.6.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - VUfl;
Weight of the powder charge, g - 1.56-1.60;
Charging density, g/cm^3 - 0.8;
Maximum pressure of powder gases, kg/cm^2 - 2800;

The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.47-0.65,
– internal diameter, mm - 0.07-0.15,
– length, mm - 0.85-1.20.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 6.47-6.80; Bullet length, mm - 27.38-27.90; Bullet leading diameter, mm - 7.87-7.92; Bullet transverse load, g/cm^2 - 13.8; Bullet ballistic coefficient, m^2 /kg - 5.0; Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.15-2.25; Bullet core material - steel St.10; Bullet core mass, g - 1,35-1,45.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07; Sleeve length, mm - 38.36-38.70; Free sleeve volume, cm^3 - 2.54; The volume of the cartridge case with a seated bullet, cm^3 - 1.96; Material of the sleeve: steel, plated by tompak; lacquered steel; The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48; Initial bullet velocity (AKM rifle), m/s - 740-760; Bullet muzzle energy (AKM rifle). J - 1771,5-1963,8; Gasoline ignition in steel box, at 100 m with thickness of sheet - $1.1^{\pm 0,12}$ mm, not less than 80%: for 300 m with sheet thickness - $2.0^{\pm 0,18}$ mm, not less than 80%;

Markings: *The tip of the bullet is painted red*.

Cartridge with brass casing (1949 issue). The oscillating part of the bullet differs from a later production bullet

Intermediate chuck
with reduced bullet velocity "US" (57-N-231U)

In the spring of 1950 a device for silent-flame firing (PBS) for the "RP-46" machine gun was tested at the range, but was not adopted for service due to design flaws. With the changes in tactics and armament of the troops in 1954, the "GRAU" initiated the creation of a unified "PBS" for firing the SKS carbine, AK-47 assault rifle and RPD machine gun. The TsNIItochmash was entrusted with the development of the silent complex. The development of the cartridge with reduced muzzle velocity was entrusted to the designer M.A. Kuzmina under the direct supervision of N.M. Elizarov and B.V. Semin.

Tests were conducted and showed that the use of the standard "PS" bullet with a subsonic muzzle velocity was unacceptable, because the bullet had a low killing and penetrating effect, and at ranges above 200 meters the bullet dispersion became unacceptably high. Calculations showed that the desired bullet should have a mass of about 13.25 grams and an initial flight speed of about 275-295 m/s. When developing the new cartridge, it was not possible to

The design of the weapon had to undergo structural changes, and creating a bullet according to the classic scheme would have required reducing the pitch of the rifles in the barrel, which contradicted the main requirement of the program.

The initial choice was a bullet with a lead core. In order to place a lead core weighing 10.5 grams in the bullet, the rear cone of the bullet had to be sacrificed. The improvement of the gas seal in the bore was achieved by increasing the diameter of the lead part of the bullet from 7.92 $-_{0,05}$ mm to 7.95 $-_{0,03}$ mm and adding a radius cavity at the bottom of the lead core (R = 3.3 mm). Since the remaining volume of the cartridge case for the propellant charge was less than the volume in the cartridge case with the "PS" bullet, cartridges with the "US" bullet were filled with pistol powder of the "P-45" brand.

Sets of documentation and drawings for bullet cartridge design

The "US" and "PBS" bullets were ready by December 1954. At the same time the first pilot batch of 30,000 rounds of cartridges with the bullet "US" (OP02-E-61) was made. Factory tests, which ended in January 1955, showed full compliance of the cartridges (TTT GAU №006029). In February-March 1955 the "NIPSMVO" conducted range tests in Shchurovo, which did not pass the tests for effectiveness of shot silencing, smokelessness, shot stability, and durability of obturators. Also, in comparison with the standard cartridges with the "PS" bullet, the accuracy of the fire was 1.5-2 times worse. In June 1955 additional tests were conducted, which showed that the US bullet does not pierce the steel helmet of the SS-40 at ranges over 100 meters.

For the new tests in January 1956, an experimental batch of OP-04 with modified US bullets was produced. The new bullet

The "US" had two cores: a steel (U12A tool steel) at the front and a lead at the rear. The diameter of the leading part of the bullet was reduced to 7.94-$_{0,02}$ mm, the bullet mass was corrected - 12.4-12.7 grams and the initial bullet velocity - V_{10} = 270- 295 m/s. The accuracy of the R_{50} at 100 meters did not exceed 3.5 cm. The bullet ensured penetration of the steel helmet "SS-40" at a range of up to 400 meters, as well as penetration of steel plates of steel vest of steel grade 30 FGN with thickness of 2 mm.

In 1959 the "PBS" for the AKM and the cartridge with the "US" bullet under the index *"GRAU 57-N-231U" were adopted* for service. Initially the cartridges were produced at NII-61, and when adopted for service the cartridge production was transferred to plant #711 (Klimovskiy Stamping Plant) and serial production was started in 1962 (pre-production models of 1961 production are known). The cartridges were produced with bimetal and steel lacquered cartridge cases. Since 1963 the joint of the cartridge case with the bullet and the primer was painted with red lacquer.

In 1993, plant #711 (Klimovskiy Specialized Production Plant) developed a surrogate version of the "US" bullet, which was filled with a steel core from the "7H6" bullet.

The "US" ammunition of the old packing was packed in wooden boxes of 1200 cartridges with 6x7 obturators in cardboard boxes. The new boxes contained 1,360 rounds of ammunition

and 6 obturator shells. Cartridges are marked with a black bullet tip color with a green band and a double black-green stripe on the package.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-56,0;
Cartridge weight, g - 19.8-20.2.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; P-45;
Weight of the powder charge, g - 0.53-0.55;
Charging density, g/cm^3 - 0.324;
Maximum pressure of powder gases, kg/cm^2 - 1200;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.64-0.94,
– internal diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet mass,
g - 12.45-12.60; Bullet length,
mm - 33.4-33.6;
Bullet leading diameter, mm - 7.92-7.94; Bullet
transverse load, g/cm^2 - 25.58; Bullet ballistic
coefficient, m^2 /kg - 3.51;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.25-235;
Bullet core material - steel St.10; Bullet core mass,
g - 1.52-1.56.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type,
flangeless; Weight of the cartridge case with the
primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;

Free sleeve volume, cm^3 - 2.54;
The volume of the cartridge case with a seated bullet, cm^3 - 1.7;
Material of the sleeve - steel, plated by tompak; lacquered steel;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48;
Initial bullet velocity (AKM rifle), m/s - 293-310; Bullet muzzle energy (AKM rifle), J - 539.9-605.4; Marking: *the tip of the bullet is painted purple with green; the tip of the bullet is painted green.*
with a belt.

CARTRIDGE OPTIONS

Cartridge with "US" bullet, bimetal casing, red lacquer on the junction

US bullet cartridge with lacquered steel casing

Intermediate chuck
for the special pistol complex "PS-1"

Special cartridge "PS-1"

The specific tasks of underwater saboteurs required the creation of a special mounting tool in the 1970s. On the basis of the 1943 cartridge sleeve, the Central Research Institute for Precision Engineering created the 7.94 mm PS-1 special cartridge with a dowel for attaching special devices to structures made of various materials, such as steel, concrete and wood.

The institute also developed a firing device for this cartridge. Use of a special pistol complex
"SPK-1" is possible not only on land, but also under water. The complex was developed by a group of specialists consisting of V.I. Abramov, V.I. Zubachev and P.I. Serdyukov. In 1979 it was adopted for supply to the Navy.

Despite the fact that the Russian army is now officially armed with the 5.45x39 mm cartridge and weapons for it, the troops have a significant number of 7.62x39 mm Kalashnikov submachine guns and light machine

guns.

SPECIAL PISTOL COMPLEX "SPK-1"

The cartridge is 7.94x39 "PS-1";
The caliber is 7.94×39;
Length of the gun - 280 mm; Capacity of the magazine - 6 cartridges; Dowel clamping force:

– in steel and concrete structures - 100 kg;
– in wooden structures - 40 kg; Maximum depth of application - 40 m.

Intermediate chuck
with a high penetration bullet "PP" (7N27)

At the end of the 1990s, specialists at the design bureau of Plant 711 (Klimovsk Stamping Plant) developed an automatic rifle cartridge with a bullet of increased penetration.

The "PP" bullet consists of a tompak-clad steel jacket with a truncated apex, a sharp core of hardened tool steel, a cap of thin metal foil coated with green lacquer, and a lead jacket. The foil is used to prevent wear of the gun and magazine components when feeding ammunition.

By 2001 the plant had mastered the production of these cartridges, but they were not adopted for service, and a year later the cartridge with the armor-piercing bullet "BP" developed by KB Plant #17 (Barnaul Machine-Tool Plant) was adopted for service.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-56,0;
Cartridge weight, g - 16.0-16.5.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,97;
Weight of the powder charge, g - 1.58;
Charging density, g/cm^3 - 0.81;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is ellipsoid-spheroid:
– outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet mass, g - 7.87-7.91; Bullet length, mm - 27.18-27.70;
Bullet leading diameter, mm - 7.87-7.92; Bullet transverse load, g/cm^2 - 15.97; Bullet ballistic coefficient, m^2 /kg - 4.29;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.10-2.25;
Bullet core tool material - steel U12, U12A; Bullet core mass, g - 3.2-3.6.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;
The volume of the cartridge case with a seated bullet, cm^3 - 1.97;
Material of the sleeve - steel, plated by tompak; lacquered steel;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48;
m/s, 725-740; Bullet muzzle energy (AKM), J, 1909.4-2068.3;
Penetration:

– steel plate St.3 per 100 m: 16 mm,
– 50 m boron carbide plates: 80%,
– 2P armor plates at 200 m: 5 mm,

Markings: *The tip of the bullet is painted black with a red band.*

Intermediate chuck

with the armor-piercing bullet "BP" (7H23)

In the late 1990s the design bureau of Plant 17 (Barnaul Machine-Tool Plant) under the leadership of D.I. Veronsky and V.V. Zakharyaschev developed the ammunition "BP". Zakharyaschev developed an automatic ammunition cartridge with an armor-piercing bullet "BP". The cartridge was adopted by the Russian Army in 2002 under the index *"GRAU 7N23"*. By its design, the armor-piercing bullet is a modernization of the "PS", for which a new core has been developed. The "BP" armor-piercing bullet is designed to defeat manpower, including those equipped with personal protective equipment, firearms and unarmored vehicles.

The "BP" bullet consists of a steel, tobacco-coated shell, a pointed core of hardened U12A steel and a lead jacket. Cartridges with lacquered steel shells are produced only by the Barnaul cartridge factory. Armor-piercing cartridges are marked with the black color of the bullet tip and a black stripe on the package.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-56,0;
Cartridge weight, g - 16.0-16.5.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,97;
Weight of the powder charge, g - 1.58;
Charging density, g/cm^3 - 0.81;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is ellipsoid-spheroid:
– outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 7.87-7.91; Bullet length, mm - 27.18-27.70;
Bullet leading diameter, mm - 7.87-7.92; Bullet transverse load, g/cm^2 - 15.97; Bullet ballistic coefficient, m^2 /kg - 4.3;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.10-2.25;
The material of the bullet core is tool steel U12, U12A;
Bullet core mass, g - 3.2-3.6.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;
The volume of the cartridge case with a seated bullet, cm^3 - 1.97;
Material of the sleeve - steel, plated by tompak; lacquered steel;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48;

Initial bullet velocity (AKM rifle), m/s - 725-740;

Bullet muzzle energy (AKM assault rifle), J, 1909.4-2068.3;

Armor penetration: 80% penetration of 2P armor sheet of thickness 5 mm, at an angle of 90^0 at a range of 200 m;

Markings: *The tip of the bullet is painted black with a red band.*

Intermediate cartridge with reduced ricochet bullet "PRS43"

In 2002, cartridges with reduced ricocheting ability of the bullet were developed and adopted by the Russian Interior Ministry. Army ammunition with a steel-core bullet is unsuitable for police operations in cities, since a supersonic bullet with a steel core causes a large number of ricochets when hitting walls of houses and other hard obstacles. Firing military ammunition can lead to unnecessary collateral damage. In order to minimize ricochets, cartridges for MIA personnel are equipped with lead-core bullets with a similar or similar construction to those in sport-hunting cartridges. When hitting an obstacle, the lead-core bullet crumples, loses velocity quickly and forms fewer fragments upon impact, thus reducing the likelihood of unwanted ricochets and collateral damage.

Cartridges with PRS bullets are produced by the Vympel plant. B 2008 The Barnaul cartridge factory specialists developed

a special version of the cartridge with the bullet "ORS". ORS" cartridges have distinctive markings in the form of purple varnish at the junction of the cartridge case and the bullet, and the cartridge cases are commercially branded (factory cartridges have
"Vympel") or a special marking on the package "7.62 ORS gs" (for cartridges manufactured by BPZ).

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-56,0;
Weight of the cartridge, g - 16.2-16.9.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade -
SSNf 30/3,97;
Weight of the powder charge, g - 1.7-1.8;
Charging density, g/cm^3 - 0.8;
Maximum pressure of powder gases, kg/cm^2 - 3000;
The shape and size of the powder grain is ellipsoid-spheroid:
– outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet

weight, g - 7.8-8.0;

Bullet length, mm - 22.52-22.80;
Bullet leading diameter, mm - 7.87-7.92; Bullet transverse load, g/cm^2 - 16.24; Bullet ballistic coefficient, m^2 /kg - 4.24;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.1-2.2;
Bullet core material - lead with an admixture of 1-2% antimony;
Bullet core mass, g - 5.8-6.0.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;
The volume of the cartridge case with a seated bullet, cm^3 - 2.25;
Material of sleeve - steel, clad with tompak; steel clad with brass;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48;
m/s, 710-725; Bullet muzzle energy (AKM), J, 1993.8-2102.5;
Marking: *purple lacquer on the joints of the cartridge case and the bullet*.

Intermediate sport-hunting cartridge 5G

In the early 1990s, cartridge factories in Russia mastered the production of 7.62 mm intermediate sporting and hunting cartridges both for export and for the domestic market.

The nomenclature of sport-hunting cartridges includes three types of bullets:

1. FMJ" and "FMJBT" solid-core bullets with lead core (early cartridges were sometimes equipped with steel-core military bullets).

2. Expansive "HP" and "HPBT" bullets (early examples of these bullets were sometimes made from army bullets and loaded with steel cores).

3. SP semi-hollow point bullets with a bare lead core.

Hunting cartridges are filled with VUfl powders, "OSNf 33/4,03-8" ("with powder grain size - 0.65-0.95 mm", used for bullets with a mass of 8 grams); "OSNf 33/4,03-9" ("same", but for bullets with mass of 9 grams); "OSNf 33/4,03-10" ("same", but for bullets with mass of 10 grams) and Salyut-6 ("cylinder with channel" for bullets with mass of 8.2 grams).

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;

Chuck length, mm - 55,4-56,0;

Cartridge weight, g - 17.0-20.0.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - VUfl;

Weight of the powder charge, g - 1.7-1.8;

Charging density, g/cm^3 - 0.8;

Maximum pressure of powder gases, kg/cm^2 - 3000;

The shape and size of the powder grain is a cylinder with a channel:

– outer diameter, mm - 0.47-0.65,

– internal diameter, mm - 0.07-0.15,

– length, mm - 0.85-1.20.

BULLET CHARACTERISTICS

Bullet type - jacketed; Bullet
weight, g - 8.0-10.0; Bullet
length, mm - 22.52-22.80;
Bullet leading diameter, mm - 7.87-7.92; Bullet
transverse load, g/cm^2 - 16.24; Bullet ballistic
coefficient, m^2 /kg - 4.24;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.1-2.2;
Bullet core material - lead with an admixture of 1-2% antimony;
Bullet core mass, g - 5.8-6.0.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type,
flangeless; Weight of the cartridge case with the
primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;
The volume of the cartridge case with a seated bullet, cm^3 - 2.25;
Material of sleeve - steel, clad by tompak; steel, clad by brass;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48;
Initial velocity of the bullet (AKM rifle), m/s - 700-720;
Range of effective shooting up to 300m.

BPZ CARTRIDGES

Barnaul cartridge factory produces cartridges with bullets "MFJ" (7,62x39-8,0), "SP" with 8,1 and 9,7 grams weight and "HP" (7,62x39-8,1 TU 3-3.2207-89) with 8 grams weight with steel lacquered, brass-coated, galvanized cartridge cases, as well as with phosphate-polymer-coated cases.

"FMJ", 8 grams, lacquered steel casing, red lacquer on the joints of the casing

"FMJ", 8 grams, galvanized steel sleeve, red lacquer on sleeve joints

"SP", lacquered steel sleeve, red lacquer on sleeve joints

"SP", galvanized steel sleeve, red lacquer on sleeve joints

"HP", galvanized steel sleeve, red lacquer on sleeve joints

VYMPEL FACTORY CARTRIDGES

The Amur Cartridge Factory mastered the production of hunting cartridges with "FMJ" bullets (also supplied to the Russian Interior Ministry as MRS bullets), "HP" and "SP" with lacquered steel cartridges.

CARTRIDGE OPTIONS

"FMJ", 8 grams, lacquered steel cartridge case, red lacquer on the junction with the primer and purple lacquer on the junction with the bullet

"HP", steel lacquered cartridge case, red lacquer on the junction with the primer and purple lacquer on the junction with the bullet

"SP", lacquered steel sleeve

CARTRIDGES OF THE KSPZ PLANT

The Klimovsk specialized cartridge factory produces hunting cartridges with "FMJ" bullets weighing 8 g and 9 g, "SP" bullets weighing 8 g and "HP" bullets weighing 8 g and 9 g. The cartridges are produced with bimetal and nickel-plated steel cartridges, as well as with steel cartridges with phosphate-lacquer coating.

CARTRIDGE OPTIONS

"FMJ", bimetallic sleeve

"SP", lacquered steel sleeve

CARTRIDGES OF THE TPZ PLANT

The Tula cartridge factory produces cartridges with "FMJ" (7.62x39.000-02) and "HP" (7.62x39.000-01) bullets weighing 7.9
The HP bullet manufactured by TPZ has ring grooves on the inner surface of the shell. The HP bullet manufactured by TPZ has annular and longitudinal grooves on the inner surface of the jacket.

TMP JSC cartridges were produced under various trademarks (TCW Ammunition, WOLF, etc.) both for export and for the domestic market. Currently the plant produces cartridges under its own brand "TulAmmo". TMP cartridges are produced with steel sleeves with phosphate-lacquer (in the past) and phosphate-polymer (at present) coatings.

CARTRIDGE OPTIONS

"FMJ", phosphate-polymer-coated steel sleeve

"SP", steel sleeve with phosphate-polymer coating

"FMJ", phosphate-polymer-coated steel cartridge case, tom-pack bullet jacket

CARTRIDGES OF THE UMP PLANT

The Ulyanovsk cartridge factory produced a line of hunting cartridges with an expansive bullet "HP" (7.62x39-8) weighing 8 grams and a series of cartridges "Effect":

- 8M is an 8-gram, all-carb bullet with a fragile nose and notches on the inner surface of the bullet casing.
- 8M1 - bullet weighs 8.13 grams, has a pointed projection on the tip and notches on the inner surface of the casing, the tail of the bullet is conical in shape. The bullet has an increased accuracy.
- 8M3 - bullet weighs 8.5 grams, has a hole in the tip and notches on the inner surface of the jacket, the tail of the bullet is conical. The bullet has improved fire accuracy.
- 8M4 - bullet weighs 8.5 grams, has a hole in the tip and notches on the inner surface of the shell, the tail of the bullet is spherical.
- 8M5 - Expansive bullet has a hole on the tip and notches on the outer surface of the shell, due to which it has an increased expansive effect.

CARTRIDGE OPTIONS

"8M", lacquered steel sleeve

"8M5", lacquered steel sleeve

"FMJ", phosphate-lacquered steel sleeve

"8M1", steel sleeve with phosphate-lacquer coating

"HP", phosphate-lacquered steel sleeve.

Intermediate chuck

"Exemplary" (57-H-231)

For the purpose of measuring complex shooting, certification of ballistic weapons and new ammunition samples, exemplary ammunition is used.

The requirements for the elements of exemplary cartridges (bullet, cartridge case, case), as well as the storage times are exactly the same as for 5.45x39 ammunition.

Sample cartridges are filled only with "PS" and "US" bullets. No other bullets are to be used in sample cartridges. The upper part of the bullet of the exemplary cartridge is painted white.

CARTRIDGE CHARACTERISTICS

Kali6r - 7.62×39;

Chuck length, mm - 55,4-56,0;

Weight of the cartridge, g - 16.3-16.8.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade - SSNf 30/3,97;
Weight of the powder charge, g - 1.58;
Charging density, g/cm^3 - 0.8;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is ellipsoid-spheroid:
- outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 7,75-8,05; Bullet length, mm - 26,28-26,80;
Bullet leading diameter, mm - 7.87-7.92; Bullet transverse load, g/cm^2 - 16.34; Bullet ballistic coefficient, m^2 /kg - 4.08;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.05-2.25;
Bullet core material - steel St.10; Bullet core mass, g - 3.52-3.55.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;
The volume of the cartridge case with a seated bullet, cm^3 - 2.01;
Material of sleeve - steel, plated by tompak; steel, plated by brass; steel, coated by varnish;
The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

The cross-sectional area of the barrel bore (AKM rifle), cm^2 - 0.48;

Initial bullet velocity (AKM rifle), m/s - 710-725;

Bullet muzzle energy (AKM assault rifle), J, 1953.4-2115.6;
Markings: *The apex of the bullet is painted white with a red band at the junction of the cartridge case*.

High pressure intermediate cartridge "VD"

High-pressure cartridges are designed to test the strength of gun barrels in factory tests. When fired, the high-pressure bullet exerts increased pressure on the bore walls of the barrel. The "VD" ammunition is loaded with a lead-core bullet that has a characteristic shape with a ledge and two point cores. The "VD" ammunition is longer than the standard "PS" ammunition.

VD cartridges are packaged in cardboard boxes of 20 and the packaging is labeled "HIGH PRESSURE".

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 61,0-61,5;
Weight of the cartridge, g - 17.81-17.86.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder brand - VUfl or SSNf 30/3,97; Powder charge mass, g - 1,7-1,8; Charging density, g/cm^3 - 0,8;
Maximum pressure of powder gases, kg/cm^2 - 4500.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet weight, g - 9,1-9,2; Bullet length, mm - 27,28-27,80; Bullet leading diameter, mm - 7.87-7.92; Bullet transverse load, g/cm^2 - 16.24; Bullet ballistic coefficient, m^2 /kg - 4.24; Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.2-2.5; Bullet core material - lead with an admixture of 1-2% antimony; Bullet core mass, g - 6.6-7.0.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type, flangeless; Weight of the cartridge case with the primer, g - 6.70-7.07; Sleeve length, mm - 38.36-38.70; Free sleeve volume, cm^3 - 2,5; The volume of the cartridge case with a seated bullet, cm^3 - 2.25; Material of sleeve - steel, clad by tompak; steel, clad by brass; The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

Intermediate chuck

with an amplified charge "UZ" (7Sh6)

The "UZ" ammunition is designed to test the locking mechanism of small arms during factory testing. The "UZ" ammunition develops a higher maximum pressure

The UZ cartridge is loaded with a steel-core "PS" bullet. The "UZ" cartridge is loaded with a steel-core "PS" bullet.

UZ ammunition is packaged in cardboard boxes of 20 and the package is labeled "EXPENSIVE FREEDOM". The UZ cartridge bullet is colored black.

CARTRIDGE CHARACTERISTICS

Kali6r - 7.62×39;
Chuck length, mm - 55,4-56,0;
Cartridge weight, g - 15.6-15.8.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade -
P-125 or P-45;
Weight of the powder charge, g - 0.75-0.92;
Charging density, g/cm^3 - 0.8;
Maximum pressure of powder gases, kg/cm^2 - 3100.

BULLET CHARACTERISTICS

Bullet type - jacketed; Bullet
mass, g - 7.75-8.05; Bullet length,
mm - 26.28-26.80;
Bullet leading diameter, mm - 7.87-7.92; Bullet
transverse load, g/cm^2 - 16.34; Bullet ballistic
coefficient, m^2 /kg - 4.08;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g -
2.05-2.25;
Bullet core material - steel St.10; Bullet core mass,
g - 3.52-3.55.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type,
flangeless; Weight of the cartridge case with the
primer, g - 6.70-7.07;
Sleeve length, mm - 38.36-38.70;
Free sleeve volume, cm^3 - 2,5;

The volume of the cartridge case with a seated bullet, cm^3 - 2.01;

Material of sleeve - steel, plated by tompak; steel, plated by brass; steel, coated by varnish;

The method of attaching the bullet is a tight fit and crimping of the muzzle edge of the cartridge case.

MORE INFO

Cross-sectional area of the barrel bore (AKM rifle) cm^2 - 0.476;

Markings: *The bullet is painted black*.

Intermediate special blank cartridge "PCS-19"

Based on the cartridge casing of the 7.62 mm cartridge of 1943, special auxiliary cartridges for throwing grenades and a cartridge for a special pistol complex were created. In 1950 the VG-45 rifle grenade launcher (mounted on the muzzle of the SKS carbine) was adopted by the Soviet Army.

The grenade launcher fired rifle anti-tank grenades VPG-1 and rifle fragmentation grenades

"VOG-1. They were thrown from the grenade launcher using special blank cartridges "PCS-45" (blank special cartridge).

The TsNIItochmash designer M.I. Lysenko developed a special bouncing cartridge, "PCS-19" (blank special cartridge), for the 30-mm silenced underbarrel grenade launcher system "Tishina", based on the cartridge casing of the 1943 Rifle Rifle.

The muzzle of this cartridge case is crimped with a star. It is shorter than the blank cartridge. The silent firing of the grenade launcher was ensured by a piston placed inside the grenade launcher barrel. In the process of firing, powder gases pressed on the piston, which in turn pushed the grenade out of the barrel.

After giving the necessary impulse to the grenade, the gas dynamic braking of the piston took place. As a result, the piston reaches the forward position at minimum velocity. The powder gases were cut off by the piston in the grenade launcher barrel and gradually vented to the atmosphere.

The grenade had a muzzle velocity of about 100 m/s, providing an aiming range of about 300 m.

The ammunition was packaged 4 at a time in cardboard boxes and moisture-proof bags marked with a red-green stripe. The ammunition was stored in metal boxes in a quantity of 64 pieces together with 30-mm grenades. The PHS-19 ammunition was produced at Plant No. 711 (Klimovsk Stamping Plant).

CARTRIDGE CHARACTERISTICS

Caliber, 7.62 × 38;
Cartridge length, mm -
37.2; Cartridge weight, g -
8; Powder weight, g -
1.55;
Powder type - smokeless, pyroxylene; Powder grade -
P-125;
Material of the cartridge case is steel, clad in tompak. Markings: *Head part of the cartridge is painted black*.

Intermediate special blank cartridge KPS-45

In 1945 the rifle grenade launcher was adopted for service "VG-45. The grenade launcher was mounted on the muzzle of a 7.62 mm Simonov SKS carbine. The VG-45 rifle grenade launcher was fired by a rifle anti-tank shaped-action grenade VPG-1 and a rifle fragmentation grenade VOG-1. The grenade launcher was also used for throwing rifle illuminating and signaling grenades. The VG-45 grenade launcher used a special blank cartridge KPS-45.

The special blank cartridge "KhPS-45" is based on the cartridge case of the 7.62 mm submachine gun cartridge of 1943. The cartridge is loaded with P-45 powder. The muzzle of the cartridge case is crimped with a star and coated with varnish for airtightness.

XPS-45 blank cartridges are not interchangeable with regular blank cartridges.

CARTRIDGE CHARACTERISTICS

Caliber - 7.62 × 38;

Cartridge length, mm -

37.2; Cartridge weight, g -

8; Powder weight, g - 0.9;

Powder type - smokeless, pyroxylene; P-45;

Material of the cartridge case is steel, clad in tompak. Markings: *the head part of the cartridge is painted green*.

Intermediate special blank cartridge "RG015"

In the late 1970s, specialists of the Central Research Institute of Precision Machine Building developed a special pyrotechnic torch "RG022" (RPM-20) "Vozgonka" designed for cutting metal rods of various diameters, carrying out repair and installation and emergency rescue work in the air and under water. Cutting torches can also be used for breaking open barriers when penetrating into a room.

Small dimensions and weight, autonomous operation and high power capacity ensure the possibility and convenience of using the pyrotechnical torch in hard-to-reach places and limited space at ambient temperatures from $+50^0$ C to -50^0 C.

The Vozgonka torch uses special cold cartridges "RG015" based on a 7.62 mm automatic rifle cartridge case. Cutting is performed by using the cutting element of low-temperature plasma generated during the combustion process of special ballistic powder.

The RG015 cartridge is marked with a distinctive marking - green color on the top of the cartridge case and white color on the seal between the cartridge case and primer. Cartridges are packed in 20-piece cartons and two cartons in an unmarked aluminum box. RG015 cartridges are not interchangeable with PCS-19 or other blank cartridges.

CARTRIDGE CHARACTERISTICS

Caliber - 7.62 × 38;
Cartridge length, mm -
37.2; Cartridge weight, g -
8.5; Cartridge charge
weight, g - 1.6;
Material of the cartridge case is steel, clad in tompak. Markings: *Head part of the cartridge is painted black*.

CHARACTERISTICS OF THE TORCH RPM-20 "VOZGOLONKA"

Weight of the torch, kg - 4.5;
Cutter length, mm - 300;
The magazine capacity is 8 rounds.
Cross-section of the bar to be cut, mm,^{2} - 80-315;
Total time of the cutting operation, sec - 8.

Intermediate cartridge "Blank" (57-X-231)

In 1949 a blank cartridge was adopted as part of the AK-47 assault rifle under the index *"GRAU 57-X-231"*. The blank cartridge is designed to simulate the sound effect of a shot fired from all types of standard weapons designed for this cartridge. The cartridge is used with a bushing screwed onto the muzzle of the barrel for blank firing. The cartridge and bushing were developed by E.T. Rozanov, designer of the Central Research Institute of Fine Arts.

The cartridge is an elongated cartridge case with the edge of the cartridge case crimped by a star. Until 1952 blank cartridges were produced with brass casing and later cartridges with bimetal casing were produced. The top of the cartridge was varnished with red or purple lacquer, while the joint between the cartridge case and the magazine was not varnished. In the 1990's the production of blank cartridges with lacquered steel casing for the army and civilian noise cartridges with steel casing with phosphate-lacquer and phosphate-polymer coating and commercial bottom marks was mastered.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Cartridge length, mm - 48,2-48,8;
Weight of the cartridge, g - 8,12-8,30.

CHARACTERISTICS OF THE POWDER CHARGE

Powder type - smokeless, pyroxylene; Powder grade -
P-125;
Weight of the powder charge, g - 0.73-0.77;
Charging density, g/cm^3 - 0.266;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.7-1.0,
– internal diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.1.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type,
flangeless; Weight of the cartridge case with the
primer, g - 7.80-7.93;
Sleeve length, mm - 48,6-4,0; Free sleeve
volume, cm^3 - 3,0; Compressed sleeve
volume, cm^3 - 2,0;
The sleeve material is steel, clad in tompak.
Markings: *The head part of the cartridge is colored dark red or purple*.

Blank cartridge with bimetal casing.
The top is painted with purple lacquer

Blank cartridge with lacquered steel case

Blank cartridge with polymer-coated steel case
(Tula cartridge factory)

Intermediate chuck

"Educational" (57-N-231UCH)

The training cartridge is designed to teach the rules and techniques of handling weapons and ammunition. The training cartridge consists of the components of a live cartridge, but does not contain a powder charge, the primer is cauterized and filled with a bullet "PS".

A training cartridge is required by regulation to withstand a minimum of 50 loading cycles, for which the cartridge has a reinforced bullet retention (depending on the time of manufacture and factory, the type of

reinforced crimp-

The bullet casing may be different). Training cartridges are marked with four vertical grooves on the cartridge case. Depending on the year of manufacture, plant and condition of the equipment, the location, shape and length of the grooves may vary.

Until 1952 training cartridges were produced with steel brass and bimetallic (some factories since 1950) cartridges. From 1952 to 1991 training cartridges were mainly produced with bi-metal casings. Since 1991 cartridges were produced with lacquered steel cartridge cases. Training cartridges are packed in cardboard boxes with 20 rounds each and placed in a wooden box without metal boxes (1400 rounds), and the packaging is marked with
"TRAINING" (early cardboard boxes were marked in red, and later in the standard packaging of live ammunition without additional markings).

At gun manufacturers, technological versions of cartridges are used for verification purposes. Technological cartridges are usually manufactured from live ammunition by deburring (case drilled, primer pierced) and sometimes electrolytically coated with an additional anti-corrosion coating (zinc plating, phosphating, chrome plating or nickel plating) and the bullet is additionally secured in the cartridge case by welding at several points. In addition, when weapons were made in the absence of sufficient ammunition, cartridge pellets were produced, which were precision-ground hollow-point models made of brass or steel and which repeated the geometry of a live cartridge.

CARTRIDGE CHARACTERISTICS

Caliber is 7.62 × 39;
Chuck length, mm - 55,4-36,0;
Weight of the cartridge, g - 14.54-15.12.

BULLET CHARACTERISTICS

Bullet type - jacket; Bullet
weight, g - 7,75-8,05; Bullet
length, mm - 26,28-26,80;
Diameter of the leading part of the bullet, mm - 7.87-7.92;
Bullet jacket material - steel, clad in tompak; Bullet jacket mass, g - 2.05-2.25;
Bullet core material - steel St.10; Bullet core mass,
g - 3.52-3.55.

SLEEVE CHARACTERISTICS

Shape and type of the cartridge case - bottle-type,
flangeless; Weight of the cartridge case with the
primer, g - 6.79-7.07;
Sleeve length, mm - 38.36-38.70;
The sleeve material is steel, clad in tompak;
The bullet mounting method is a tight fit and 2-row crimping of the cartridge case muzzle.

CARTRIDGE OPTIONS

Training cartridge with steel brass casing. (Factory No.270, 1950).

Training cartridge with bimetallic cartridge case (BCC). (Factory No. 539, 1969).

Training cartridge with lacquered steel casing (GS). (Factory No.

539, 1991).

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9x39 intermediate cartridges

In the late 1970s, the USSR started developing a silent sniper rifle. By 1983, the basic tactical and technical requirements for the advanced sniper rifle, code-named "Vintorez", were finalized. Initially, the cartridge for the silent rifle was developed on the basis of a 7.62 mm caliber pistol cartridge case, for which specialists of the Central Research Institute of Precision Rifle developed a heavy long-range bullet with subsonic muzzle velocity. The accuracy of the prototype cartridge met the requirements, but did not provide sufficient killing power. To solve this problem, a new cartridge "RG-037" of 7.62 mm caliber was developed.

Intermediate cartridge "RG-037"

Designer N.V. Zabelin developed two types of bullets - a sniper bullet with a double steel and lead core and a semi-bullet with a steel core.

The cartridge case was designed on the basis of the 5.45 mm caliber intermediate cartridge case, shortened to 28 mm and pressed to fit a 7.62 mm caliber bullet. Production of prototype cartridge cases was started at Plant No. 539 (Tula Cartridge Factory) and continued until 1984, when the cartridge was redesigned and its caliber was increased to 9 mm.

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 7.62×28;
Cartridge length, mm - 45,0;
Bullet diameter, mm - 7.92;
Powder type - smokeless, pyroxylin; P-45 powder grade;
The material of the sleeve is lacquered steel;
The method of bullet attachment is a tight fit and crimping of the muzzle edge of the cartridge case.

By the mid-1980s, the tactical-technical requirements for the complex were changed and required that it be capable of engaging enemy personnel using personal protective equipment at ranges of up to 400 meters. The bullet of the RG-037 cartridge did not meet the new TTT requirements, and by 1984 a cartridge with a larger 9.0 mm caliber was developed. The casing of the new cartridge was based on the casing of the 7.62x39 mm intermediate cartridge.

The sniper cartridge with a solid-core bullet with a combined core was designated "SP-5", and the cartridge with an armor-piercing semi-automatic bullet was designated "SP-6".

SP-5 intermediate cartridge with steel-core bullet (7N8)

In 1984, designer N.V. Zabelin and technologist L.S. Dvo-ryaninova developed a 9.0 mm caliber cartridge for the Vin-torez silent sniper rifle, based on the 7.62 mm caliber intermediate cartridge case. The SP-5 sniper cartridge is designed to engage enemy forces at a range of up to 400 meters. The bullet of the SP-5 cartridge consists of a bimetallic jacket and a combined core - a steel core in the bullet head and a lead core. The cartridge was adopted for service in 1987.

Experimental SP-5 cartridges were produced with bimetallic and steel cartridge cases (gray-colored phosphated cartridge cases without lacquer coating, and green-colored cartridge cases with phosphate-lacquer coating). Serial production of SP-5 cartridges was started at the Klimovsk Stamping Plant (Plant No. 711), and later at the Klimovsk Stamping Plant (Plant No. 711).

No. 539 (Tula Cartridge Factory). Early cartridges had

The cartridges were packed in cartons of 10 cartridges (old stacking boxes of 800 cartridges and 20 cartridges (new stacking boxes of 1160 cartridges). The cartridges are packed in cartons of 10 pieces (old-style boxes of 800 cartridges) and 20 pieces (new-style boxes of 1,160 cartridges).

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.6-56.2;
Cartridge weight, g - 23.2-23.8.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; P-45 powder grade;
Powder charge mass, g - 0.5-0.6;
Charge density, g/cm^3 - 0.443;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.64-0.94,
– inner diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTIC

The bullet type is jacketed;

Bullet weight, g - 16.0-16.2;
Bullet length, mm - 36.0-36.2;
Diameter of the leading part of the bullet, mm - 9,22-9,27; Bullet cross load, g/cm^2 - 24,0; Bullet ballistic coefficient, m^2 /kg - 2,1;
Bullet jacket material - steel, clad with tompak; Bullet jacket weight, g - 4.5-4.7;
Bullet core material - steel St.10; Bullet core weight, g - 3,1-3,2.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - bottle, flangeless;
Weight of cartridge case with primer, g - 6.7-7.0;
Sleeve length, mm - 38.4-38.74;
Free volume of the sleeve, cm^3 - 2.53;
Volume of the cartridge case with a seated bullet, cm^3 - 1.3;
The material of the sleeve is lacquered steel;
The method of bullet attachment is a tight fit and crimping of the muzzle edge of the cartridge case.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (VSS rifle), cm^2 - 0.65;
Initial bullet velocity (VSS rifle), m/s - 285-295; Bullet muzzle energy (VSS rifle), J - 649,8-704,9; Penetration: 90% of steel sheet 5 mm of steel grade St.3 on the 100 м;
Marking: the *edge of the cartridge case muzzle is painted in red laca at the junction of* the *cartridge case and the bullet.*

AMMUNITION OPTIONS

Steel sleeve with phosphate-lacquer coating

Intermediate cartridge "SP-6" with an armor-piercing bullet

For the "VAL" assault rifle system in 1985, the designer of the Central Research Institute of Precision Engineering Y.Z. Florov and technologist E.S. Kornilova developed the "SP-6" 9.0 mm caliber assault rifle cartridge with an armor-piercing bullet.

The SP-6 cartridge is designed to engage live forces, including those equipped with personal protective equipment, at a range of up to 400 meters. The SP-6 bullet consists of a truncated bimetallic jacket, a bare steel core and a lead handguard. The cartridge was adopted for service in 1987 under the index of
"SP-6". Serial production of cartridges is deployed at the plant
No. 711 (Klimovsk Stamping Plant) with steel lacquered and bimetallic cartridge cases, and later at Plant No. 539 (Tula Cartridge Plant) with steel lacquered cartridge cases only. The cartridges have no bottom markings on the cartridge cases, but the cartridges of factories #711 and #539 are visually distinguished by the sharpness of the tip of the armor-piercing core. "SP-6" has a distinctive marking - black coloring of the bullet tip and a black stripe on the package. The ammunition packaging is similar to that of the "SP-5" cartridges.

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.6-56.2;
Cartridge weight, g - 22.8-23.0.

CHARACTERIZATION OF THE POWDER CHARGE

The type of gunpowder is smokeless, pyroxylin;

The brand of gunpowder is P-45;
Powder charge mass, g 0.5-0.6;
Charge density, g/cm^3 - 0.558;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.64-0.94,
– inner diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTIC

Bullet type - semi-bullet; Bullet
weight, g - 15,5-15,7; Bullet
length, mm - 40,5-41,0;
Diameter of the leading part of the bullet, mm - 9,22-
9,27; Bullet cross load, g/cm^2 - 24,0; Bullet ballistic
coefficient, m^2 /kg - 2,1;
Material of the bullet jacket - steel, clad with tompak; Bullet jacket
weight, g - 3.9-4.3;
Bullet core material - U12A tool steel; Bullet core weight, g - 9.2-9.5.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - bottle, flangeless;
Weight of cartridge case with primer, g - 6.7-7.0;
Sleeve length, mm - 38.4-38.7;
Free volume of the sleeve, cm^3 - 2.53;
Volume of the cartridge case with a seated bullet, cm^3 - 1.0;
The material of the sleeve is lacquered steel;
The method of bullet attachment is a tight fit and crimping of the muzzle edge of the cartridge case.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (VSS rifle), cm^2 - 0.65;
Initial bullet velocity (VSS rifle), m/s - 285-295;
Bullet muzzle energy (VSS rifle), J - 649.8-704.9;

Penetration: 90% of 7 mm steel plate made of St.3 grade steel on the 100 м;

Markings: the *tip of the bullet* is *colored black.*

AMMUNITION OPTIONS

Steel sleeve with phosphate-lacquer coating

Intermediate chuck with an armor-piercing bullet "PAB 9,000"

In 1995, specialists of the KBP State Unitary Enterprise developed the PAB 9.000 (*9.0 mm caliber armor-piercing machine gun cartridge*) with an armor-piercing bullet of increased penetration. The cartridge is designed to hit manpower, including those equipped with personal protective equipment, at a range of up to 400 meters. The PAB 9 bullet consists of a bimetallic jacket with a truncated tip, a pointed steel core made of high-carbon heat-strengthened steel and a lead jacket. The PAB 9 bullet is similar in construction to the SP-6 bullet, but differs in weight and length, and the core has a small ledge.

Production of "PAB 9" cartridges was established in 1995 at the factory No. 539 (Tula Cartridge Plant). The cartridge was not adopted by the Russian Army, so it does not have the "GRAU" index, but was supplied for the needs of the Russian Interior Ministry. The cartridges were produced only with steel

The cartridges of the first production batch had a civilian type cartridge case bottom marking (Δ 95). The cartridges of the first installation batch had a civilian type cartridge case bottom stamp (Δ 95), and the bullet had no distinctive markings and was equipped with a sharpened core. Later "PAB 9.000" cartridges had a bottom branding with the manufacturer "TPZ" (Tula Cartridge Factory), caliber and year of issue (the font and order of reading the branding changed). In serial cartridges the bullet was equipped with a stamped core, and the tip of the bullet was colored black. The production of PAB 9.000 cartridges was discontinued in 2003 with the introduction of the 7H9 and 7H12 cartridges.

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.6-56.2;
Cartridge weight, g - 24.9-25.1.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; P-45 powder grade;
Powder charge mass, g - 0.5-0.6;
Charge density, g/cm^3 - 0.66;
Maximum pressure of powder gases, kg/cm^2 - 2800;

The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.64-0.94,
– inner diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTIC

Bullet type - semi-bullet; Bullet weight, g - 17,0-17,2; Bullet length, mm - 42,2-43,0; Diameter of the leading part of the bullet, mm - 9,22-9,27; Bullet cross load, g/cm^2 - 24,0; Bullet ballistic coefficient, m^2 /kg - 2,1;
Bullet jacket material - steel, clad with tompak; Bullet jacket weight, g - 4,0-4,5;
Bullet core material - U12A tool steel; Bullet core weight, g - 9.2-9.5.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - bottle, flangeless;
Weight of cartridge case with primer, g - 6.7-7.0;
Sleeve length, mm - 38.4-38.7;
Free volume of the sleeve, cm^3 - 2.33;
Volume of the cartridge case with a seated bullet, cm^3 - 0.9;
The material of the sleeve is lacquered steel;
The method of bullet attachment is a tight fit and crimp, edging the muzzle of the cartridge case.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (VSS rifle), cm^2 - 0.65;
Initial bullet velocity (VSS rifle), m/s - 285-295; Bullet muzzle energy (VSS rifle), J - 649,8-704,9; Penetration: 90% of steel sheet 8 mm of steel grade St.3 on the 100 м;
Marking: the *tip of* the *bullet is painted and black.*

Steel sleeve with phosphate-lacquer coating

Intermediate cartridge with high penetration bullet "SPP" (7N9)

In 2002, specialists of the KBAL and KB of the Tula Cartridge Plant started the development of new, modernized 9.0 mm caliber cartridges under the government order. To replace the SP-5 cartridge, a sniper cartridge with a bullet of increased penetration was developed. The SPP cartridge is designed to hit live forces protected by personal protective equipment at ranges up to 400 meters. Bullet

"The SPP consists of a bimetallic jacket with a truncated tip and a combined core - a bare steel core in the bullet head and a lead core behind it. The SPP bullet penetrates a 5 mm thick steel plate made of St.3 steel at a range of 100 m or a 6B23 body armor at a range of 250 m.

In 2006, serial production of 9x39 "SPP" cartridges was started at Plant No. 539 (Tula Cartridge Factory), adopted for service under the index *"GRAU - 7N9"*. Until 2009, the cartridges were produced with phosphate-lacquer coated steel cartridge cases, and since 2010, the production of cartridges with phosphate-lacquer coated steel cases was started. Serial cartridges have a distinctive marking in the form of a blue bullet tip (experimental cartridges had a dark purple bullet tip).

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.8-56.2;
Cartridge weight, g - 22.8-23.0.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; P-45 powder
grade;
Powder charge mass, g - 0.5-0.6;
Charge density, g/cm^3 - 0.66;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is a cylinder with a channel:

– outer diameter, mm - 0.64-0.94,
– inner diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTIC

Bullet type - semi-bullet; Bullet
weight, g - 15,6-15,8; Bullet
length, mm - 36,0-36,2;
Diameter of the leading part of the bullet, mm - 9,22-
9,27; Bullet cross load, g/cm^2 - 24,0; Bullet ballistic
coefficient, m^2 /kg - 2,1;

Bullet jacket material - steel, clad with tompak; Bullet jacket weight, g - 4,0-4,5;
Bullet core material - U12A tool steel; Bullet core weight, g - 9.2-9.5.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - bottle, flangeless;
Weight of cartridge case with primer, g - 6.7-7.0;
Sleeve length, mm - 38.4-38.7;
Free volume of the sleeve, cm^3 - 2.33;
Volume of the cartridge case with a seated bullet, cm^3 - 0.9;
The material of the sleeve is lacquered steel;
The method of bullet attachment is a tight fit and crimp, edging the muzzle of the cartridge case.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (VSS rifle), cm^2 - 0.65;
Initial bullet velocity (VSS rifle), m/s - 305-315; Bullet muzzle energy (VSS rifle), J - 649,8-704,9; Penetration: 90% of steel sheet 5 mm of steel grade St.3 on the 100 м;
Marking: the *tip of* the *bullet is colored and blue.*

AMMUNITION OPTIONS

Steel sleeve with phosphate-lacquer coating

Intermediate chuck
with armor-piercing bullet "BP" (7N12).

In 2002, KBAL specialists together with the Design Bureau of the Tula Patron Plant started the development of new, modernized 9.0 mm caliber cartridges under a government order. To replace the "SP-6" cartridge, a cartridge with armor-piercing bullet "BP" was developed. The cartridge is designed to defeat manpower protected by personal protective equipment at ranges up to 400 meters.

"The BP bullet consists of a bimetallic jacket with a truncated top, a steel core and a lead jacket. The BP bullet is capable of penetrating a 7 mm thick steel plate made of St.3 steel at a range of 100 meters.

In 2004, serial production of the cartridge adopted for service under the index *"GRAU 7N12" was* launched at Plant No. 539 (Tula Cartridge Plant). Until 2009, the cartridges were produced with phosphate-lacquer coated steel cartridge cases, and in 2010 the production of cartridges with phosphate-lacquer coated steel cases was started. Serial cartridges have distinctive markings in the form of a black bullet tip and a black stripe on the package. The cartridges are marked on the package with the conventional designation "9x39 BP gs" and "9x39 BP gsp".

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.6-56.2;
Cartridge weight, g - 22.4-22.6.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; P-45 powder grade;
Powder charge mass, g - 0.5-0.6;

Charge density, g/cm^3 - 0.56;
Maximum pressure of powder gases, kg/cm^2 - 2800;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.64-0.94,
– inner diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTIC

Bullet type - semi-bullet; Bullet weight, g - 15,4-15,6; Bullet length, mm - 40,0-41,0; Diameter of the leading part of the bullet, mm - 9,22-9,27; Bullet cross load, g/cm^2 - 24,0; Bullet ballistic coefficient, m^2 /kg - 2,1;
Material of the bullet jacket - steel, clad with tompak; Bullet jacket weight, g - 3.9-4.3;
Bullet core material - U12A tool steel; Bullet core weight, g - 9.2-9.5.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - bottle, flangeless;
Weight of cartridge case with primer, g - 6.7-7.0;
Sleeve length, mm - 38.4-38.7;
Free volume of the sleeve, cm^3 - 2.53;
Volume of the cartridge case with a seated bullet, cm^3 - 1.0;
The material of the sleeve is lacquered steel;
The method of fixing the bullet is a tight fit and crimping the edge of the cartridge case muzzle.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (VSS rifle), cm^2 - 0.65;
Bullet muzzle velocity (VSS rifle), m/s - 285-295; Bullet muzzle energy (VSS rifle), J - 649,8-704,9; Penetration rate: 90% of steel sheet 7 mm of steel grade St.3 at 100 m; Marking: *bullet tip is painted in black color.*

Steel sleeve with phosphate-lacquer coating

Intermediate sport-hunting cartridge "PSO"

In the early 2000s, KB KSPZ attempted to develop a civilian version of the sport-hunting cartridge, caliber

9x39 mm. In 2002, a pilot batch was developed with bimetallic and brass cartridge cases. The cartridge was fitted with a lead-cored bullet similar to the 9x39/SP5 bullet.

In 2012, the cartridge of this caliber was certified for the civilian market, and in parallel, TsKIB SOO and TPZ are developing their own version of the sport-hunting cartridge.

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.8-56.2;
Cartridge weight, g - 23.3-23.5.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; P-45 powder
grade;
Powder charge mass, g - 0.5-0.6;
Charge density, g/cm^3 - 0.55;
Maximum pressure of powder gases, kg/cm^2 - 2600;
The shape and size of the powder grain is a cylinder with a channel:

– outer diameter, mm - 0.64-0.94,
– inner diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTIC

Bullet type - jacketed; Bullet
weight, g - 15,4-15,6; Bullet
length, mm - 36,0-36,2;
Diameter of the leading part of the bullet, mm - 9,22-
9,27; Bullet cross load, g/cm^2 - 24,0; Bullet ballistic
coefficient, m^2 /kg - 2,1;
Material of the bullet shell - steel, clad with tompak; Bullet shell
weight, g - 4,5-4,7;
Bullet core material is lead with 1-2% antimony admixture.

SLEEVE CHARACTERISTIC

Shape and type of sleeve - bottle-shaped, flangeless;

Weight of cartridge case with primer, g - 6.7-7.0;
Sleeve length, mm - 38.4-38.7;
The material of the sleeve is lacquered steel;
The method of bullet attachment is a tight fit and crimping of the muzzle edge of the cartridge case.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel, cm^2 - 0.65;
Initial bullet velocity, m/s - 305-315;
Bullet muzzle energy, J - 649.8-704.9;
Average heap accuracy R_{50} at a range of 100 m: ≤ 7.5 cm.

Intermediate chuck
"SP-5-UZ" with a reinforced charge

Reinforced cartridges are designed to test the strength of the locking mechanism of small arms during factory tests. The UZ cartridge develops a higher maximum pressure due to the reinforced powder charge. The UZ cartridge is loaded with a bullet from the SP-5 cartridge.

UZ ammunition is packaged in cardboard boxes of 20, and the package is labeled with the words "Amplified Charge". The bullet of the cartridge
"UZ" is colored black.

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.6-56.2;
Cartridge weight, g - 23.3-23.5.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; P-45 powder
grade;
Charge density, g/cm^3 - 0.443;
Maximum pressure of powder gases, kg/cm^2 - 3000;
The shape and size of the powder grain is a cylinder with a channel:
– outer diameter, mm - 0.64-0.94,
– inner diameter, mm - 0.1-0.2,
– length, mm - 0.9-1.3.

BULLET CHARACTERISTIC

Bullet type - jacketed; Bullet
weight, g - 16,0-16,2; Bullet
length, mm - 36,0-36,2;
Diameter of the leading part of the bullet, mm - 9.22-9.27;

Bullet cross load, g/cm^2 - 24.0;
Bullet ballistic coefficient, m^2 /kg - 2.1;
Bullet jacket material - steel, clad with tompak; Bullet jacket weight, g - 4.5-4.7;
Bullet core material - steel St.10; Bullet core weight, g - 3,1-3,2.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - bottle, flangeless;
Weight of cartridge case with primer, g - 6.7-7.0;
Sleeve length, mm - 38.4-38.74;
Free volume of the sleeve, cm^3 - 2.53;
Volume of the cartridge case with a seated bullet, cm^3 - 1.3;
The material of the sleeve is lacquered steel;
The method of bullet attachment is a tight fit and crimping of the muzzle edge of the cartridge case.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (VSS rifle), cm^2 - 0.65;
Bullet muzzle velocity (VSS rifle), m/s - 285-295; Bullet muzzle energy (VSS rifle), J - 649,8-704,9; Marking: *bullet* is *painted in black color.*

Intermediate training cartridge "SP-6-UCH"

The training cartridge is designed to teach the rules and techniques of handling weapons and ammunition. The training cartridge consists of the components of a live cartridge, but does not contain a powder charge,

the primer is hollow-pointed and loaded with SP-5 bullet (there are known technologically advanced models of training cartridges with SP-6 bullet).

The training cartridge must withstand a minimum of 50 loading cycles, for which the cartridge has a reinforced bullet attachment (in the form of a double crimp into the double cannelure on the bullet). Training cartridges are marked with four vertical grooves on the cartridge case.

The SP-6-UCH cartridges produced in the year the VSS system was adopted into service had a bottom stamp "71,187". Later training cartridges were produced with steel cartridge cases without bottom marks and were equipped with oxidized and hardened primer-igniter.

Manufacturers of weapons designed for 9x39 mm caliber cartridges use technological cartridges, which are produced by hollowing out live cartridges and knurling the cartridge case (sometimes the cartridges are additionally coated with cadmium to increase the corrosion resistance of training cartridges).

CHARACTERISTICS OF THE CARTRIDGE

The caliber is 9×39;
Cartridge length, mm - 55.6-56.2;
Cartridge weight, g - 22.7-23.2.

BULLET CHARACTERISTIC

Bullet type - jacketed; Bullet
weight, g - 16,0-16,2; Bullet
length, mm - 36,0-36,2;
Diameter of the leading part of the bullet, mm - 9.22-9.27;
Bullet jacket material - steel, clad with tompak; Bullet jacket weight, g - 4.5-4.7;
Bullet core material - steel St.10; Bullet core
weight, g - 3,1-3,2.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - bottle, flangeless;
Weight of cartridge case with primer, g - 6.7-7.0;

Sleeve length, mm - 38.4-38.7;
The material of the sleeve is lacquered steel;
The method of bullet attachment is tight fit and 2-row crimping of the cartridge case muzzle.

AMMUNITION OPTIONS

Steel sleeve with phosphate-lacquer coating

appendix

Intermediate "Thunder" cartridge with a steel-core bullet

In 1992-93, a 9×30 mm cartridge was created under the code name of "Grom". The "Grom" submachine gun was developed for this cartridge and demonstrated at the Moscow arms exhibition in 1997. The necessity of the development was caused by the acute shortage of domestically produced 9 mm submachine guns with high combat and performance characteristics and to solve the problems of penetrating 1B2 body armor at a range of 100 m and increasing the stability of the weapon when firing from unstable positions.

The Grom bullet has a much higher muzzle velocity than its closest Russian follower, the 9×21 mm,
"RG-052" (RG-054). There are two types of "Grom" cartridges: with plain and armor-piercing bullet. Plain bullet, identical to the bullet of the 9×19 cartridge
"Luger", and the armor-piercing bullet of the 9×21mm "RG-054" cartridge.

The cartridge itself is another "stretched" 9×19mm cartridge, the case is steel with a phosphate-lacquer coating.

In terms of ballistic characteristics, it occupies a space between the Russian-made 9×21 and 7.62×39 mm cartridges. Moreover, standard Russian intermediate cartridges, such as 5.45×39, 7.62×39 and 9×39 mm, perform significantly better than any pistol ammunition when fired from compact AKS-74U, OTs-14 or A-91 rifles, regardless of whether the bullet has a muzzle velocity of 600 m/s, as in the 9×30 mm cartridge, or 430 m/s, as in the 9×21 mm cartridge.

The 9×30mm cartridge remains an experimental design.

CARTRIDGE CHARACTERISTIC

Caliber, mm - 9×30 "Grom";
Cartridge length, mm - 40.8-41.1;
Cartridge weight, g - 12.62-12.83.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; Powder grade -
Sf033fl;
Powder charge mass, g - 1.00-1.05;
Charging density, g/cm³ - 0.95;
Maximum pressure of powder gases, kg/cm² - 2650;
The shape and dimensions of the powder grain are ellipsoid-spheroid:
- outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTIC

Bullet type - jacketed; Bullet
weight, g - 6,42-6,55; Bullet
length, mm - 15,8-16,0;
Diameter of the leading part of the bullet, mm - 9,02-9,12;
Transverse load of the bullet, g/cm³ - 10,03; Ballistic
coefficient of the bullet, m²/kg - 10,28;
Bullet jacket material - steel clad with tompak; Bullet jacket weight, g
- 1.6-1.7;
Bullet core material - steel St.10; Bullet core
weight, g - 3.4-3.5.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - spherical, flangeless;
Weight of cartridge case with primer, g - 5.2-5.3;
Sleeve length, mm - 30,05-30,20;
Free volume of the cartridge case, cm³ - 1.43;
Bullet case volume, cm³ - 1.11; Case material -
lacquered steel; Bullet attachment method - tight fit.

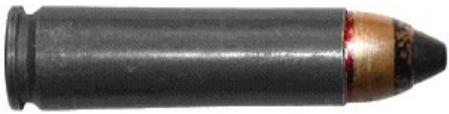
ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (Cheetah rifle) cm² - 0.64;

Initial bullet velocity (Cheetah rifle), m/s - 600-610;

Bullet muzzle energy (Cheetah assault rifle), J - 1155.6-1218.6.

Intermediate "Thunder" cartridge with an armor-piercing bullet



CHARACTERISTICS OF THE CARTRIDGE

Caliber, mm - 9×30 "Grom";

Cartridge length, mm - 40,8-41,1;

Cartridge weight, g - 12,70-12,95.

CHARACTERIZATION OF THE POWDER CHARGE

Powder type - smokeless, pyroxylin; Powder grade - Sf033fl;

Powder charge mass, g - 0.88-0.91;

Charging density, g/cm³ - 0.95;

Maximum pressure of powder gases, kg/cm² - 2650;

The shape and dimensions of the powder grain are ellipsoid-spheroid:

- outer diameter, mm - 0.45-0.75.

BULLET CHARACTERISTIC

Bullet type - semi-bullet; Bullet weight, g - 6,70-6,74; Bullet length, mm - 18,8-19,2;

Diameter of the leading part of the bullet, mm - 9,22-9,27;

Transverse load of the bullet, g/cm² - 10,6; Ballistic coefficient of the bullet, m²/kg - 10,34;

Bullet jacket material - steel, clad with tompak; Bullet jacket weight, g - 1.70-1.85;
Bullet core material - carbon steel; Bullet core weight, g - 3.1-3.5.

SLEEVE CHARACTERISTIC

Shape and type of cartridge case - spherical, flangeless;
Weight of cartridge case with primer, g - 5.2-5.3;
Sleeve length, mm - 30,05-30,20;
Free volume of the sleeve, cm^3 - 1.43;
Bullet case volume, cm^3 - 0.96; Case material - lacquered steel; Bullet attachment method - tight fit.

ADDITIONAL INFORMATION

Cross-sectional area of the barrel channel (Cheetah rifle) cm^2 - 0.64;
Bullet muzzle velocity (Cheetah rifle), m/s - 590-600; Bullet muzzle energy (Cheetah rifle), J - 1166,1-1213,2; Marking: bullet tip is painted in black color.

TABLE of trajectory excesses above the aiming line when firing the "AK-74" assault rifle, "PS (7N6)" cartridge with a bullet mass of 3.4 g.; Initial velocity - 880 m/sec; Altitude - 15 meters above sea level; Temperature + 15^0 C; Pressure - 749 mm Hg; Wind speed - 0 m/sec.

Distance in meters	50	100	150	200	250	300	350	400	450	500
Sight	Exceedances, cm									
1	0,9	0,0	-2,3	-7,9	-16,8	-28,9	-44,5	-63,4	-	-
2	1,1	3,9	3,6	0,0	-6,9	-17,1	-30,6	-47,6	-67,9	-
3	3,9	9,6	12,1	11,4	7,4	0,0	-10,7	-24,8	-42,3	-63,2
4	7,0	15,8	21,4	23,8	22,8	18,6	11,0	0,0	-14,4	-32,2

TABLE of excesses of trajectory over the aiming line when firing from "AKM" assault rifle, cartridge "PS (57-N-231S**)" with bullet mass - 7.9 g.; Initial velocity - 710 m/sec.; Altitude - 15 m.; Temperature + 15^0 C; Pressure - 749 mm. Hg. column; Wind speed - 0 m/sec.**

Distance in meters	**50**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**
Sight	**Exceedances, cm**									
1	0,0	0,0	-4,9	-14,8	-29,8	-49,8	-75,0	-	-	-
2	3,7	7,4	6,2	0,0	-11,3	-27,6	-49,1	-75,8	-	-
3	8,3	16,6	20,0	18,4	11,7	0,0	-16,9	-39,0	-66,3	-
4	13,1	26,4	34,6	37,9	36,1	29,2	17,2	0,0	-22,5	-50,2

TABLE of trajectory exceedances above the aiming line when firing "VSS" rifle, "SPP (7N9)" cartridge with bullet mass - 15.7 g.; Initial velocity - 310 m/sec.; Altitude - 15 m.; Temperature + 15^0 C; Pressure - 749 mm. Hg. column; Wind speed - 0 m/sec.

Distance in meters	50	100	150	200	250	300	350	400	450	500
Sight	Exceedances, cm									
1	10,50	0,00	-37,20	-102,20	-195,80	-	-	-	-	-
2	36,10	51,10	39,50	0,00	-68,00	-165,10	-	-	-	-
3	63,60	106,10	122,00	110,10	69,60	0,00	-99,20	-228,40	-	-
4	92,20	163,20	207,60	224,20	212,30	171,30	100,60	0,00	-130,90	-292,40

TABLE of trajectory exceedances above the aiming line when firing "VSS" rifle, cartridge "BP (7N12)" with bullet mass - 15.5 g.; Initial velocity - 290 m/sec.; Altitude - 15 m.; Temperature + 15^0 C; Pressure - 749 mm. Hg. column; Wind speed - 0 m/sec.

Distance in meters	50	100	150	200	250	300	350	400	450	500
Sight	Exceedances, cm									
1	12,50	0,00	-42,90	-116,60	-221,50	-	-	-	-	-
2	41,60	58,30	44,60	0,00	-75,70	-185,00	-	-	-	-
3	72,50	120,00	137,10	123,40	78,50	0,00	-110,00	-254,10	-	-
4	104,20	183,50	232,40	250,40	237,30	190,50	112,40	0,00	-147,20	-329,90

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